U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB80-112261

Survey of Larval Fish in the Michigan Waters of Lake Erie, 1975 and 1976

Michigan Dept of Natural Resources, Lansing Water Quality Div

Prepared for

Environmental Research Lab, Duluth, MN

Aug 79

United States
Environmental Protection
Agency

Environmental Research
Laboratory
Duluth MN 55804

EPA-600/3-79-095
August 1979

Research and Development

PB80-112261

EPA

Survey of Larval Fish in the Michigan Waters of Lake Erie, 1975 and 1976

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

RESEARCH REPORTING SERIES

Research reports of the Office of Research and Development, U.S. Environmental Protection Agency, have been grouped into nine series. These nine broad categories were established to facilitate further development and application of environmental technology. Elimination of traditional grouping was consciously planned to foster technology transfer and a maximum interface in related fields. The nine series are:

1. Environmental Health Effects Research
2. Environmental Protection Technology
3. Ecological Research
4. Environmental Monitoring
5. Socioeconomic Environmental Studies
6. Scientific and Technical Assessment Reports (STAR)
7. Interagency Energy-Environment Research and Development
8. "Special" Reports
9. Miscellaneous Reports

This report has been assigned to the ECOLOGICAL RESEARCH series. This series describes research on the effects of pollution on humans, plant and animal species, and materials. Problems are assessed for their long- and short-term influences. Investigations include formation, transport, and pathway studies to determine the fate of pollutants and their effects. This work provides the technical basis for setting standards to minimize undesirable changes in living organisms in the aquatic, terrestrial, and atmospheric environments.

This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA-600/3-79-095		PB80-112261

4. TITLE AND SUBTITLE	5. REPORT DATE
Survey of Larval Fish in the Michigan Waters of Lake Erie, 1975 and 1976	August 1979 issuing date
	6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
Ronald Waybrant and John Shauver	

9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
Water Quality Division Michigan Department of Natural Resources Lansing, Michigan 48909	1BA769
	11. CONTRACT/GRANT NO. R804522-01

12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
U.S. Environmental Protection Agency Environmental Research Laboratory - Duluth Duluth, Minnesota 55804	Final 1975-1978
	14. SPONSORING AGENCY CODE EPA-600/03

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Surveys in 1975 and 1976 in the Michigan waters of Lake Erie assessed the relative abundance and distribution of larval fish.

Seasonal fluctuations, patterns of distribution, and depth preferences were noted for the 24 larval fish taxa identified. Special emphasis was placed on four target species, walleye (Stizostedion vitreum), yellow perch (Perca flavescens), white bass (Morone chrysops) and channel catfish (Ictalurus punctatus). Of these 4 species only yellow perch and white bass were found more than occasionally.

Of the remaining 20 species collected during the study only 5 (shiners-Notropis atherinoides, N. hudsonius, alewives, gizzard shad, and rainbow smelt) were regularly captured. The clupeids (alewives and gizzard shad) were the most abundant species collected during both years (84% of all fish collected in 1975 and 85% in 1976) with shiners the second most abundant (5.5%) and rainbow smelt (4.4%) least abundant of these five species.

The northern and southern extremes of the study area held many more fish than the central portion. The 0- to 12-ft. depth zone had the largest concentrations of larval fish and concentrations gradually decreased as the depth increased.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Fishes, Lakes	Lake Erie	06/F

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
RELEASE UNLIMITED	UNCLASSIFIED	97
	20. SECURITY CLASS *(This page)* UNCLASSIFIED	22. PRICE A05-A01

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

* U.S. GOVERNMENT PRINTING OFFICE: 1979-657-060/5398

EPA-600/3-79-095
August 1979

SURVEY OF LARVAL FISH IN THE MICHIGAN WATERS OF LAKE ERIE, 1975 AND 1976

By

Ronald C. Waybrant
John M. Shauver
Water Quality Division
Michigan Department of Natural Resources
Lansing, Michigan 48909

Contract No. R804522-01

Project Officer

Nelson A. Thomas
Large Lakes Research Station
U. S. Environmental Protection Agency
Grosse Ile, Michigan 48138

U. S. ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL RESEARCH LABORATORY - DULUTH
DULUTH, MINNESOTA 55804

DISCLAIMER

This report has been reviewed by the Environmental Research Laboratory, Large Lakes Research Station, U.S. Environmental Protection Agency, Grosse Ile, Michigan, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

FOREWORD

Man's use of the Great Lakes often affects segments of the ecosystem which will not exhibit effects for many years. To assess the long term effects one must attempt to project these impacts through future years.

This report on Larval Fish Distribution provides much of the data that was used in assessing the impact of fish larval entrainment at a fossil fuel plant. It is only through the collection of vast amounts of data that we are about to understand the ecosystem in sufficient detail to make wise management decisions.

ABSTRACT

Surveys in 1975 and 1976 in the Michigan waters of Lake Erie assessed the relative abundance and distribution of larval fish.

Seasonal fluctuations, patterns of distribution, and depth preferences were noted for the 24 larval fish taxa identified. Special emphasis was placed on four target species, walleye (Stizostedion vitreum), yellow perch (Perca flavescens), white bass (Morone chrysops) and channel catfish (Ictalurus punctatus). Of these 4 species only yellow perch and white bass were found more than occasionally.

Of the remaining 20 species collected during the study only 5 (shiners-Notropis atherinoides, N. hudsonius, alewives, gizzard shad, and rainbow smelt) were regularly captured. The clupeids (alewives and gizzard shad) were the most abundant species collected during both years (84% of all fish collected in 1975 and 85% in 1976) with shiners the second most abundant (5.5%) and rainbow smelt (4.4%) least abundant of these five species.

The northern and southern extremes of the study area held many more fish than the central portion. The 0-to 12-ft. depth zone had the largest concentrations of larval fish and concentrations gradually decreased as the depth increased.

This report was submitted in fulfillment of Grant No. R-804522-01-1 by the Water Quality Division of the Michigan Department of Natural Resources, under the partial sponsorship of the U.S. Environmental Protection Agency. This report covers the period from June 1975 to November 1977, and work was completed in November 1977.

CONTENTS

	Page
Foreward	iii
Abstract	iv
Figures	vi
Tables	ix
Acknowledgments	x
1. Introduction	1
2. Summary and Recommendations	3
3. Methods and Materials	5
4. Results and Discussion	10
Yellow Perch (*Perca flavescens*)	12
Walleye (*Stizostedion vitreum*)	18
Clupeids (*Alosa pseudoharengus* and *Dorosoma cepedianum*)	19
Shiners (*Notropis* sp., *N. atherinoides* and *N. hudsonius*)	24
Freshwater Drum (*Aplodinotus grunnjens*)	29
Carp (*Cyprinus carpio*)	34
Rainbow Smelt (*Osmerus mordax*)	39
White Bass (*Morone chrysops*)	44
Miscellaneous Species	49
Surface vs. bottom distribution	50
References	51
Appendices	
A. Larval Fish Taxa Collected in Lake Erie in 1975 and 1976	52
B. Densities of Larval Fish by Contour 1975 and 1976	53
C. Densities of Larval Fish by Transect 1975 and 1976	69
D. Larval fish densities (number/100 m^3) by station for those species not described by contour and transect	85

FIGURES

Number		Page
1	Location of twenty sampling stations in the Michigan Waters of Lake Erie (1975-76).	8
2	Average Densities (No's/100 m^3) of Larval Yellow Perch per Contour, Western Lake Erie, 1975.	14
3	Average Densities (No's/100 m^3) of Larval Yellow Perch per Contour, Western Lake Erie, 1976.	15
4	Average Densities (No's/100 m^3) of Larval Yellow Perch per Transect, Western Lake Erie, 1975.	16
5	Average Densities (No's/100 m^3) of Larval Yellow Perch per Transect, Western Lake Erie, 1976.	17
6	Average Densities (No's/100 m^3) of Larval Clupeids per Contour, Western Lake Erie, 1975.	20
7	Average Densities (No's/100 m^3) of Larval Clupeids per Contour, Western Lake Erie, 1976.	21
8	Average Densities (No's/100 m^3) of Larval Clupeids per Transect, Western Lake Erie, 1975.	22
9	Average Densities (No's/100 m^3) of Larval Clupeids per Transect, Western Lake Erie, 1976.	23
10	Average Densities (No's/100 m^3) of Larval Shiners Per Contour, Western Lake Erie, 1975.	25
11	Average Densities (No's/100 m^3) of Larval Shiners Per Contour, Western Lake Erie, 1976.	26

12	Average Densities (No's/100 m^3) of Larval Shiners Per Transect, Western Lake Erie, 1975.	27
13	Average Densities (No's/100 m^3) of Larval Shiners Per Transect, Western Lake Erie, 1976.	28
14	Average Densities (No's/100 m^3) of Larval Freshwater Drum Per Contour, Western Lake Erie, 1975.	30
15	Average Densities (No's/100 m^3) of Larval Freshwater Drum Per Contour, Western Lake Erie, 1976.	31
16	Average Densities (No's/100 m^3) of Larval Freshwater Drum Per Transect, Western Lake Erie, 1975.	32
17	Average Densities (No's/100 m^3) of Larval Freshwater Drum Per Transect, Western Lake Erie, 1976.	33
18	Average Densities (No's/100 m^3) of Larval Carp Per Contour, Western Lake Erie, 1975.	35
19	Average Densities (No's/100 m^3) of Larval Carp Per Contour, Western Lake Erie, 1976.	36
20	Average Densities (No's/100 m^3) of Larval Carp Per Transect, Western Lake Erie, 1975	37
21	Average Densities (No's/100 m^3) of Larval Carp Per Transect, Western Lake Erie, 1976	38
22	Average Densities (No's/100 m^3) of Larval Rainbow Smelt Per Contour, Western Lake Erie, 1975.	40
23	Average Densities (No's/100 m^3) of Larval Rainbow Smelt Per Contour, Western Lake Erie, 1976.	41
24	Average Densities (No's/100 m^3) of Larval Rainbow Smelt Per Transect, Western Lake Erie, 1975.	42
25	Average Densities (No's/100 m^3) of Larval Rainbow Smelt Per Transect, Western Lake Erie, 1976.	43

26 Average Densities (No's/100 m^3) of Larval White Bass Per Contour, Western Lake Erie, 1975. 45

27 Average Densities (No's/100 m^3) of Larval White Bass Per Contour, Western Lake Erie, 1976. 46

28 Average Densities (No's/100 m^3) of Larval White Bass Per Transect, Western Lake Erie, 1975. 47

29 Average Densities (No's/100 m^3) of Larval White Bass Per Transect, Western Lake Erie, 1976. 48

TABLES

Number		Page
1	1975 and 1976 Sampling Run Dates and Station Numbers and Locations.	6
2	Stations Occurring on Each Contour and Transect in the Lake Erie Larval Fish Survey, 1975-76.	7
3	Monthly Abundance of Larval Fish in the Michigan Waters of Lake Erie, Showing Seasonal Succession.	11

ACKNOWLEDGMENTS

Various people participated in this project and their support is greatly appreciated. Special thanks are due to Robert Basch, Thomas Hornshaw, Joel Schaeffer, and Wheatley Hemmick. Special thanks are also due to Penny Stockel, who typed the drafts and tables for this report.

The U.S. Environmental Protection Agency project officer was Nelson Thomas, whose assistance and patience are also gratefully acknowledged.

SECTION 1

INTRODUCTION

The study of fish larvae in the western basin of Lake Erie is of particular concern because of the intensive water demand in the basin. Larval fish may be particularly vulnerable to any water use that draws water from the lake. Water is drawn from the lake to meet municipal, agricultural, and industrial needs at an increasing rate. One of the fastest growing and greatest water requirements is for cooling water for the electric generating industry. This requirement could expand significantly in the future (1). The amount of water withdrawn from the western basin could amount to one-third of the flow through the basin by the year 2025 (1, 2). Although most of this use will not be a consumptive use, entrained fish larvae will be killed during use of the water. Thus, knowledge of the distribution of eggs and fish larvae of important species in Lake Erie becomes a primary concern when planning future uses of Lake Erie waters.

The Fisheries resources in Western Lake Erie have changed considerably since the turn of the century. Most of these changes are due to enrichment and accelerated eutrophication and to overexploitation by the commercial fisheries (3, 4). As a result, the populations of desirable fish species in the western basin are low and stressed. Therefore, all aspects of protection of fish stocks must be addressed, which includes insuring the survival of larval fish when necessary. To accurately evaluate the loss of fish larvae from water uses, a knowledge of larval fish abundance and distribution in the western basin is required.

The primary objective of this study was to inventory larval fish production in the Michigan waters of the western basin of Lake Erie. This research has been coordinated with other studies in the western basin to obtain an overall view. This data base was designed to provide an overview of the importance of larval fish entrainment by power plant cooling systems. Information on larval fish in the western basin has increased in recent years, with recently published information on species composition, distribution, and abundance of larval fish in Lake Erie in the vicinity of Monroe, Michigan (2, 5).

In 1976 personnel of the Biology Section, Water Quality Division, Michigan Department of Natural Resources (MDNR), completed a 2-year survey of the larval fish populations in the Michigan waters of Lake Erie. Larval fish populations were sampled in the western basin of Lake Erie simultaneously by the MDNR, Ohio State University, and Michigan State University, (1975 and 1976). The immediate objectives of the joint survey were to: (1) inventory larval fish populations in the western basin of Lake Erie;

(2) assess seasonal fluctuations in larval fish densities; (3) determine north-to-south as well as nearshore-offshore trends; and (4) determine density and abundance of four target species, walleye (*Stizostedion vitreum*), yellow perch (*Perca flavescens*), white bass (*Morone chrysops*), and channel catfish (*Ictalurus punctatus*).

SECTION 2

SUMMARY AND RECOMMENDATIONS

Larval fish data collected in 1975 and 1976 by the Michigan Department of Natural Resources showed that the 0-to 12-ft. depth zone was by far the most important area for daytime abundance of larval fish. Densities of larval fish were much lower in water deeper than 12 ft.

In 1975 and 1976 the southern half of the study area produced more than 10 times the number of larval fish produced in the northern half except for mid-June in 1975 and late June in 1976. The very high densities recorded in the northern half of the lake in 1976 resulted from one beach tow, which had 14,567 larvae/100 m^3.

Larval clupeids were found in the 0-to 12-ft. depth zone in very high concentrations (up to 14,567 larvae/100 m^3 in 1976) and were the dominant larval fish in this zone. Clupeids were still clearly dominant in depths greater than 12 ft., constituting from 40% to 93% of the total number of fish in the samples in 1975, with an average of 85%. In 1976 this trend remained the same; clupeids made up 85% of the total larvae captured.

Larval shiners were the second most abundant species collected during the 2-year survey. No clear preference of depth zone or north-to-south distribution pattern was evident either year. The distribution pattern of larval shiners was probably due to habitat preference of the two major species, Notropis hudsonius and N. atherinoides. The utilization by N. hudsonius of the shallow or nearshore waters and N. atherinoides of the offshore waters of the study area explains the abundance of the genus Notropis at all depths and transects during the survey. The larval shiners made up approximately 5.5% of the total larvae captured during the study period.

Rainbow smelt made up 4.4% of the total larvae captured in 1976 and were the third largest group collected. Smelt were captured at greatest densities in the 24-to 30-ft. depth zone in 1975 and in the 18-to 30-ft. depth zone in 1976. Smelt were most common in the northern half of the study area, but were found in moderate concentrations in the southern half. The major source of larval smelt might have been the Detroit River, and not Lake Erie.

Clupeids, shiners, and rainbow smelt composed approximately 95% of the larvae captured during the study period. Twenty-four species of larval fish made up the remaining 5% of the total number of larvae captured during the study. In 1976 yellow perch (2.3%), white bass (1.3%), carp (0.3%), and freshwater drum (0.6%) made up 4.5% of the larvae captured. Sampling in

1975 did not represent the full season of larval production, yet yellow perch still constituted 0.5%, and white bass 4.9% of the larvae captured.

In 1975 yellow perch were most abundant in the 0-to 12-ft. depth zone and the southern half of the study area. In 1976 two pulses appeared, the first in the 0-to 12-ft. contour peaking in late May and the second in the 18-to 30-ft. contour peaking during early June.

Walleye larvae were captured at two stations in 1975 on two runs and at six stations on one run in 1976. They were generally captured on the bottom. Walleye larvae spend the daylight hours on the bottom where they were not readily captured with the methods used in this study. In 1975 sampling was begun after the peak of walleye runs had passed.

During 1975 and 1976 production of larval fish in the Michigan Department of Natural Resources study area was highly variable. The survey data were not suitable for statistical analyses. The lack of replication and variability of sampling periods allow only the above generalized statements to be made about larval fish abundance and distribution in the survey area. Research, particularly for the target species, should be designed to include sufficient samples to assess variability and to include more than a 2-year period since it is almost certain that a 2-year sampling period would miss the strong year-classes of several species.

SECTION 3

METHODS AND MATERIALS

Six transects were sampled in the Michigan waters of Lake Erie from Pte. Mouille in the north to Woodtick Peninsula in the south. These transects were set up to show possible geographical differences in the production of larvae (Figure 1). They were based on known and estimated circulation patterns in the western basin. Twenty stations were located on the transects to sample the following depth zones: 0-6 ft. (Stations 18-20); 6-12 ft. (Stations 1, 4, 7, 11, 14, 17); 12-18 ft. (Stations 5, 8, 12, 15); 18-24 ft. (Stations 2, 9, 13, 16); and 24-30 ft. (Stations 3, 6, 10).

Three of these stations (18-20) were sampled with a 363-μ, 9.1 m bag seine fitted with a 1.8-liter sample bucket. These tows were made in less than 1 m of water by wading. Filtered water volumes were calculated from the distance seined (80-100 m), the width seined (3.1 m), and depth of water (0.9 m).

The remaining 17 stations were sampled by boat, with a 571-μ, 1 m diameter, 1:5 conical plankton net fitted with a 1.8-liter plankton bucket. Sample tows were made at the surface (net completely submerged) and 1 m off the bottom at each station. Tow depths were calculated by using angle measurements of the cable used to tow the net versus the length of the towing cable at a constant rate of tow (3 knots/hour). Rate of tow was determined by pitot tube versus engine speed (revolutions/minute). Bottom and surface tows were made for 3 min. One min. was used to set and retrieve the net. The volume of water filtered was measured with a "Kahl pigmy-type" flow meter which was calibrated at the beginning of the study. Station numbers, depth zones, sampling periods, transects, and exact station locations are shown in Tables 1 and 2.

Air temperature, secchi disc, wave height, surface wind direction, and wind speed were recorded. Dissolved oxygen, water temperature, conductivity, and pH were recorded at each sample depth with a Martek Mark II water quality analyzer. These data were correlated with larval fish densities to reveal possible relationships and were used to identify distinct water masses when possible.

Icthyoplankton samples were preserved in quart jars with 10% buffered formalin and transported to the Lansing biological laboratory. Densities of larval fish are reported as the number of fish per 100 m^3. Identification was made to species unless large numbers of larvae were present (usually clupeids or Notropis species). Thus, the total number of a genus is presented in the tables, and a more specific breakdown within the taxon is presented in the text, where possible.

Table 1 Locations of Sampling Stations in Western Lake Erie and Dates of Sampling Runs 1975-76

DATE OF SAMPLING RUNS

1975

1. June 2 - June 13
2. June 16 - June 24
3. June 30 - July 3
4. July 14 - July 16
5. July 28 - July 30
6. August 11 - August 14
7. August 25
8. September 2 - September 5

1. April 21 - April 23
2. April 26 - May 7
3. May 10 - May 21
4. May 21 - June 4
5. June 6 - June 18
6. June 21 - July 2
7. July 5 - July 16
8. July 19 - July 30
9. August 2 - August 13
10. August 16 - August 27
11. August 30 - September 10

STATION AND LOCATION

Station Number	Latitude (°N)			Longitude (°W)		
	Deg	Min	Sec	Deg	Min	Sec
1	42	00	15	83	10	42
2	41	59	46	83	05	09
3	41	59	15	82	59	21
4	41	47	51	83	14	54
5	41	57	13	83	11	08
6	41	55	59	83	03	32
7	41	55	24	83	19	19
8	41	55	05	83	18	01
9	41	54	21	83	15	40
10	41	52	56	83	09	00
11	41	50	33	83	23	11
12	41	49	46	83	19	07
13	41	49	04	83	15	29
14	41	47	26	83	26	25
15	41	47	13	83	22	32
16	41	46	59	83	18	25
17	41	46	01	83	24	42
18	41	59	11	83	13	41
19	41	55	10	83	19	47
20	41	48	27	83	26	30

Table 2 Stations Occurring on Each Contour and Transect in the Lake Erie Larval Fish Survey, 1975-76

Contours

0-to 6-ft. contour includes stations 18, 19, 20

6-to 12-ft. contour includes stations 1, 4, 7, 11, 14, 17

12-to 18-ft. contour includes stations 5, 8, 12, 15

18-to 24-ft. contour includes stations 2, 9, 13, 16

24-to 30-ft. contour includes stations 3, 6, 10

Transects

Transect 1 includes stations 1, 2, 3

Transect 2 includes stations 4, 5, 6, 18

Transect 3 includes stations 7, 8, 9, 10, 19

Transect 4 includes stations 11, 12, 13

Transect 5 includes stations 14, 15, 16, 20

Transect 6 includes station 17

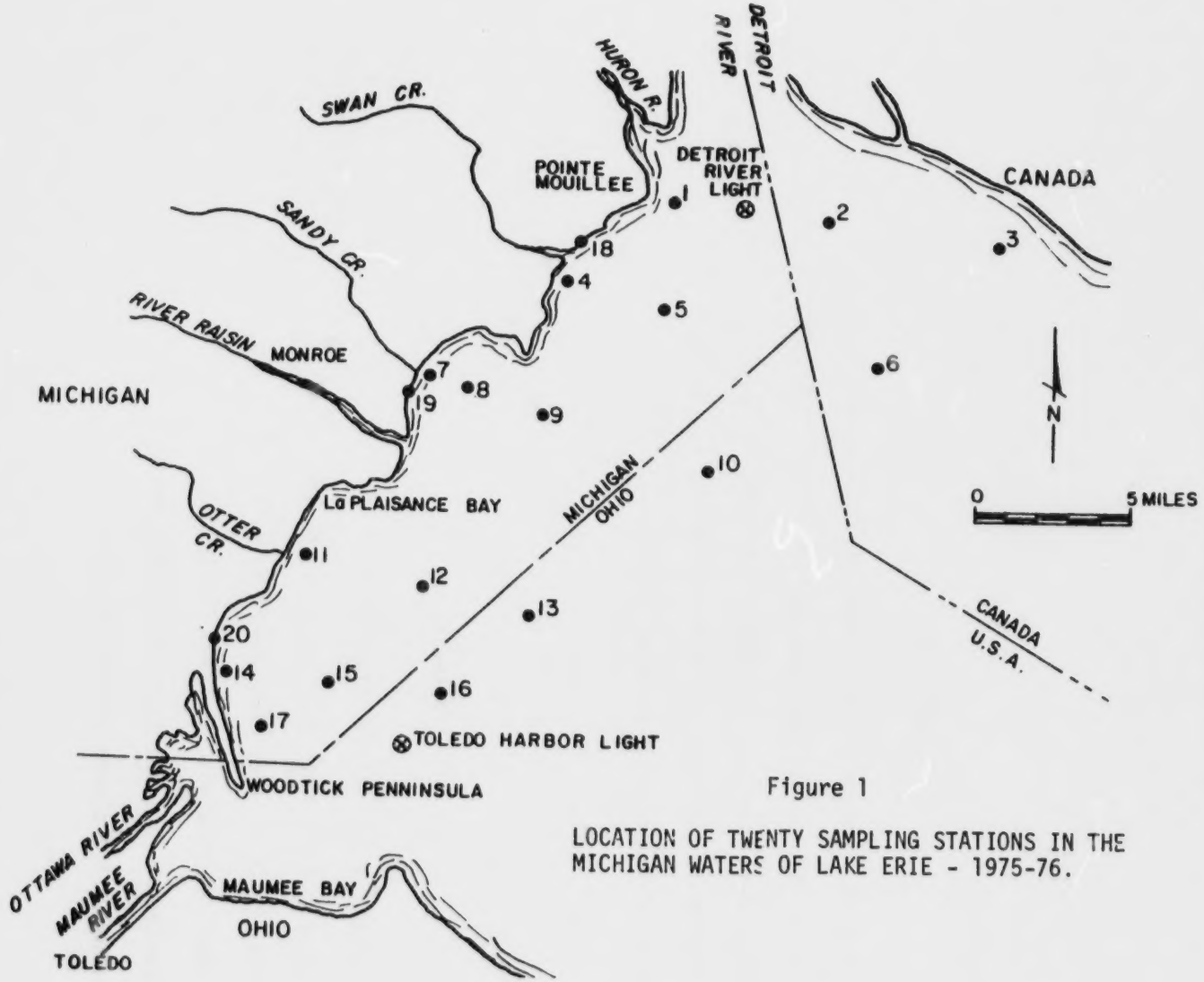


Figure 1

LOCATION OF TWENTY SAMPLING STATIONS IN THE MICHIGAN WATERS OF LAKE ERIE - 1975-76.

Because of the study design, general statistical comparisons of production by depth contours or by geographical transects could not be made. Only general trends are reported for the various species. Surface-bottom preferences of abundant species were tested for a given run at a given contour with the paired Student's T-test.

SECTION 4

RESULTS AND DISCUSSION

The production of larval fish in the nearshore study area in 1975 and 1976 was highly variable. Twenty-four species of larval fish were identified during the study program (Appendix A). The dominant fish were clupeids (gizzard shad and alewife), shiners (mostly emerald and spottail shiners), and rainbow smelt. These three groups accounted for approximately 95% of the larvae collected during the study period. Definite seasonal variation was evident; most production occurred in late May, June, and early July. In 1975 sampling was initiated too late to accurately evaluate walleye, yellow perch, and smelt production. However in the 1976 portion of the study full-scale sampling was carried out.

Four species, yellow perch, walleye, channel catfish, and white bass, which had been identified in cooling water intakes and for which there was some concern by regulatory agencies, were identified as target species. The density and abundance of the larvae of these species in Lake Erie were low. During April and May, when walleye and yellow perch should have been very abundant, they were much less abundant than expected. By the end of April, 1976 yellow perch, rainbow smelt, and white sucker larvae dominated the catch. Very few walleye were taken. Channel catfish larvae were captured only at one station in 1975. The scarcity of channel catfish larvae was probably due to the protection that they receive on their spawning grounds where they would not be vulnerable to the sampling gear. White bass larvae were found during both years and were much more abundant in 1975 than in 1976.

Seasonal succession of the various species of larvae during this 2-year study is shown in Table 3. Smelt and yellow perch were the first larvae to be captured around the end of April. They were found in moderate numbers until July. Next came the logperch, found in May, followed by clupeids near the first of June. White bass, shiners, and freshwater drum were all found in good numbers during mid-June. Clupeids and Notropis larvae were found through August. The only centrarchid larvae, both Micropterus and Lepomis, were captured in July and August.

The frequency of occurrence of various species by contour and transect is dissussed in the following sections. Possible trends of larval production are explored. Differences in surface and bottom concentrations of a larval fish species are discussed relative to possible surface-bottom daytime distribution preferences. Data used in the following analyses are presented in Appendices B through D.

Table 3 Monthly Occurrence and Abundance of Larval Fish in the Michigan Waters of Lake Erie

Month	Abundance		
	Low	Medium	High
April	Smelt		
May	White bass Logperch	Yellow perch Smelt	
June	Carp Walleye Logperch	White bass Yellow perch Shiners Freshwater drum Smelt	Clupeids
July	Yellow perch Smelt White bass Centrarchids	Clupeids Shiners	
August	Shiners Clupeids Yellow perch Centrarchids		
September	Shiners Clupeids		

YELLOW PERCH (Perca flavescens)

The yellow perch spawns in the spring (April 15 to early May), but spawning may extend into June in some areas. When water temperatures reach 44-54°F, adults migrate shoreward to the shallows of lakes and rivers to spawn; males arrive first and remain longer than females (6).

Habitat for spawning is reported to range from submerged vegetation to sand and gravel. Eggs are deposited as an accordion-like ribbon and are fertilized by several attendant males. Eggs are semi-bouyant, may attach to vegetation or the bottom, and hatch within 8-10 days. The young larvae are about 5 mm long and transparent (7). Once the yoke is absorbed (5 days), growth is rapid, and by October the juveniles may be 4 inches long.

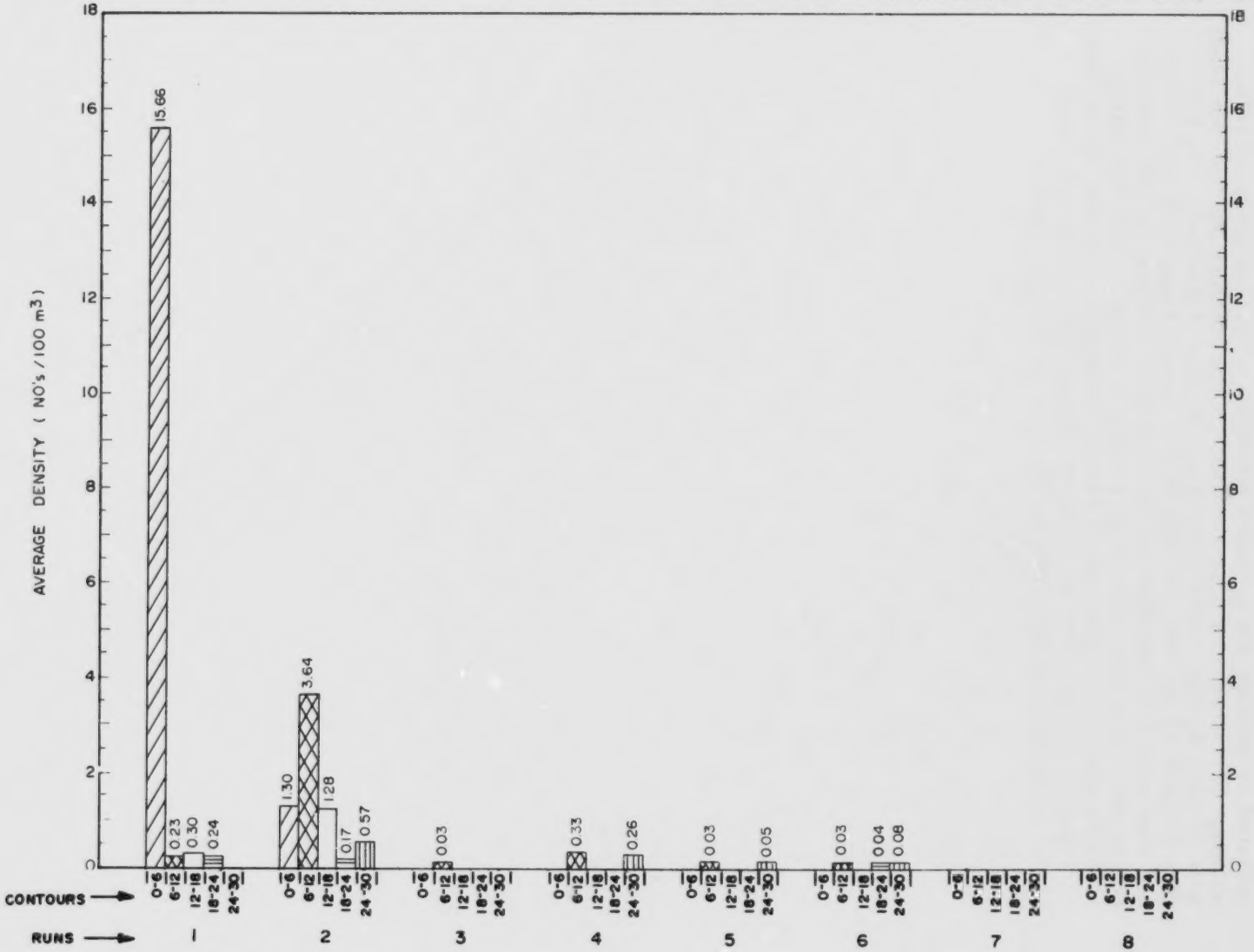
In 1975 larval perch were most abundant (up to 7/100 m^3) during the first two sampling trips (June 2-13 and June 16-24), and therefore, were captured in very low densities (less than 1/100 m^3) until August (Figure 2, App. Table B-1). The early production of prolarvae was not sampled. No larval perch were captured after the August 11-14 trip. Larval perch were most common in the southern half of the study area. Yellow perch reached their greatest density in 1975 during the first sampling run (June 2-13) in the 0-to 6-ft. contour, with a mean contour density of 15.66/100 m^3. These densities may have been the result of sampling with a modified seine which effectively reduced avoidance and could sample larvae resting on the bottom.

During the second sampling trip (run 2) perch were taken on all transects and all depth contours, indicating a lakeward dispersion of larvae after spawning. During run 2, perch were three times as dense at the 6-to 12-ft. contour than at the 0-to 6-ft. contour. In addition, the larvae were more dense at the 12-to 18-ft. contour during run 2 (1.28/100 m^3) than during run 1 (0.30/100 m^3). The absence, or near absence (less than or equal to 0.5/100 m^3) of larvae after run 2 indicates that the perch either moved out of the area or were able to avoid the sampling gear at a relatively early age.

In 1975, perch appeared to spawn early, move offshore, and were able to avoid the gear by the end of July. In 1976, our survey started 2 months earlier than in 1975, and a more distinct picture of perch spawning and migration patterns emerges (Figure 3, App. Table B-2). No perch were taken during run 1 (April 12-23), but during run 3 (May 10-21) perch larvae were taken at all contours and transects, except for transect 2. Prolarvae were most abundant in the 6-to 12-ft. and 12-to 18-ft. contours, although high densities (7.7 to 11.3/100 m^3) of prolarvae were captured at the 18-to 24-ft. and 24-to 30-ft. contours, respectively, during run 3.

The 18-to 30-ft. depth zone in the northern half of the study area appeared to produce the greatest densities of yellow perch in 1976, although prolarvae were most abundant in the southern half of the study area (Figure 4, App. Table C-1; Figure 5, App. Table C-2). By run 4 (May 21-June 4) in 1976, 92-100% of the larvae taken were post-larvae and they were most abundant in the 0-to 6-ft. contour at the northern end of the study area (transects 1 and 2). These values indicate a possible northward migration of larvae, movement of larvae due to lake circulation patterns, or an input of larvae from the Detroit River. Larval perch were absent from our samples in 1976 by August.

FIGURE 2. AVERAGE DENSITIES (NO's /100 m3) OF LARVAL YELLOW PERCH PER CONTOUR, WESTERN LAKE ERIE, 1975



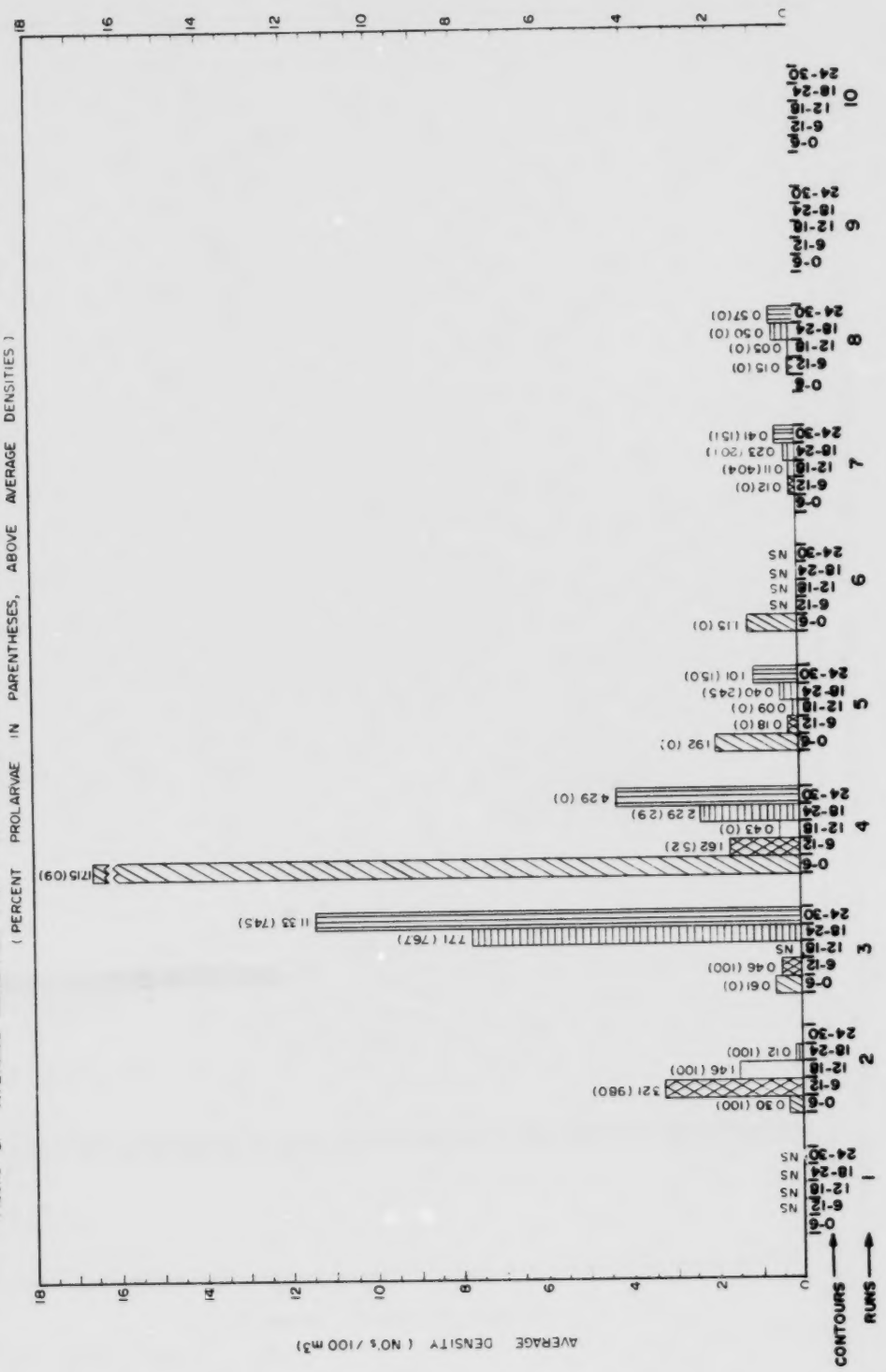


FIGURE 3. AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL YELLOW PERCH PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

FIGURE 4. AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL YELLOW PERCH PER TRANSECT, WESTERN LAKE ERIE, 1975

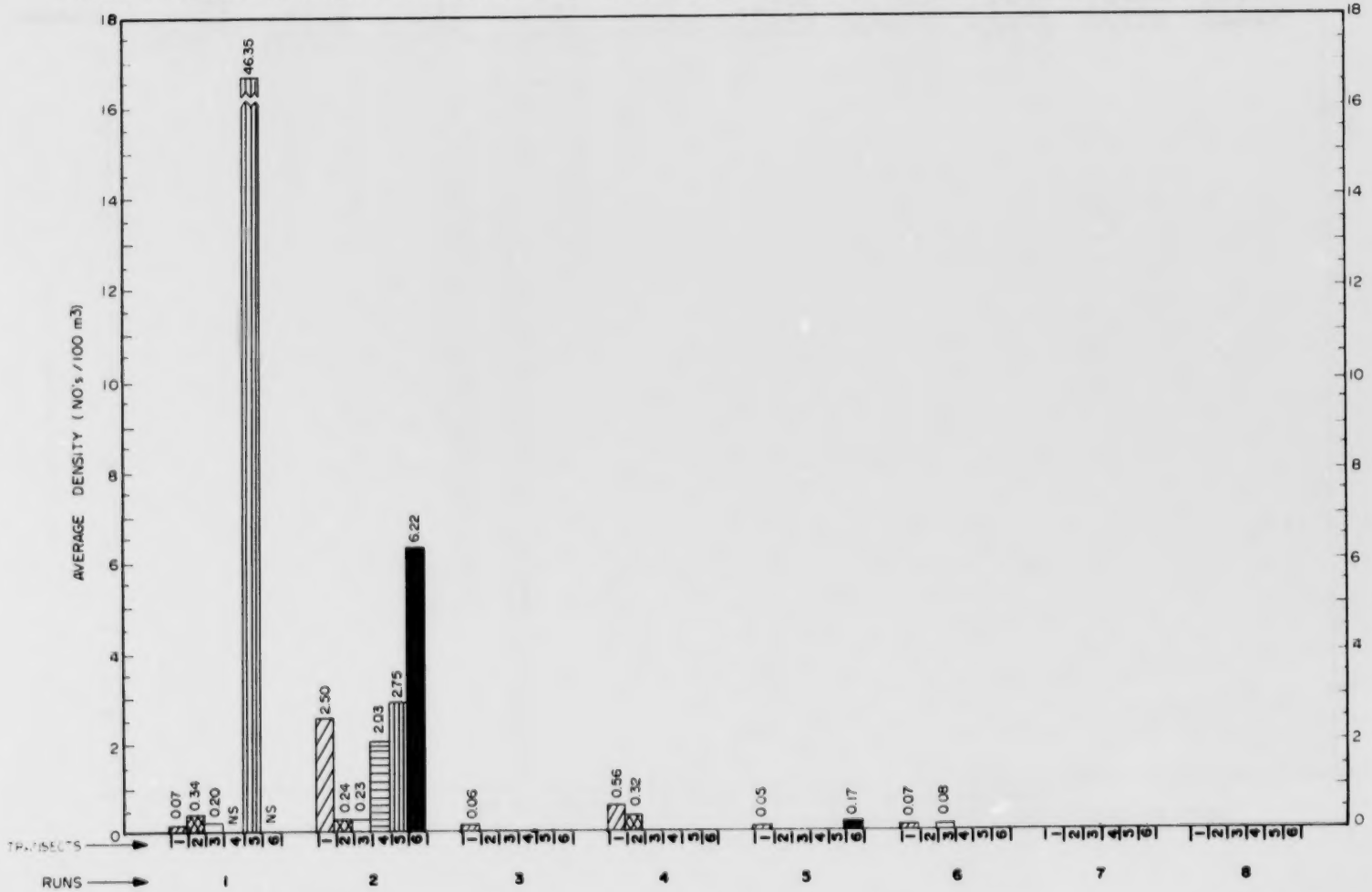
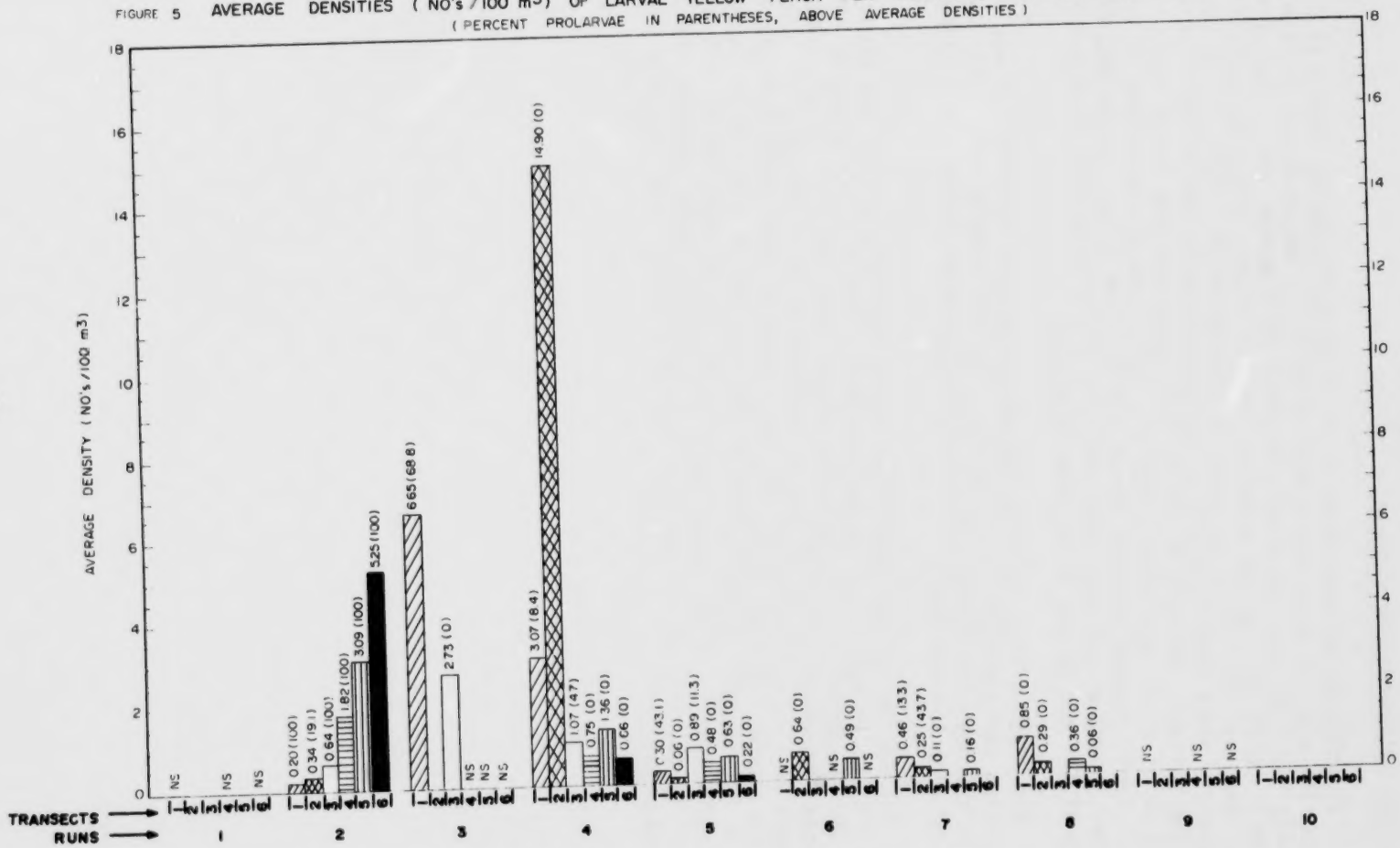


FIGURE 5 AVERAGE DENSITIES (NO's / 100 m^3) OF LARVAL YELLOW PERCH PER TRANSECT, WESTERN LAKE ERIE, 1976

(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



WALLEYE (*Stizostedion vitreum*)

Spawning of walleye usually begins in early spring (April 1), occurring shortly after ice breaks up at water temperatures of 44-48°F (6). Adults may move into the rivers to spawn even before ice is out of the lakes. Males move to the spawning grounds (rocky, gravelly shoals) first, and spawning takes place at night in shallow water. Eggs are sticky immediately after their deposition but quickly water harden and fall singly to the bottom. The eggs hatch in 12-18 days, and the larvae begin to feed about 10-15 days after hatching, before the disappearance of the yolk sac. Newly hatched walleye larvae are 6-8.6 mm long. By the end of the summer, young-of-the-year move offshore and in Lake Erie are 3.5-8 inches long at the end of the first growing season.

The 1975 walleye data are incomplete because sampling was not initiated early enough in the season. In 1976 samples were collected in April and May, and larval walleye were only taken during run 5 (June 2-18) and in very low numbers.

Walleye larvae were not taken in the southern half of the study area and all larvae were taken in bottom tows. Several factors may be responsible for the low densities captured during the study period. First, adequate habitat for spawning is lacking in Michigan waters. Second, our sampling methods may not have captured walleye larvae if they spent daylight hours on the bottom. Our net was usually towed within 1-3 ft. of the bottom but not on the bottom. Third, all the walleye larvae captured in 1975 and 1976 were prolarvae or early postlarvae. Once walleye have obtained the postlarval stage, they may be able to swim well enough to effectively avoid the sampling gear.

CLUPEIDS (Family Clupeidae)

The group clupeids in this study includes the alewife and the gizzard shad because of the large numbers of larvae in many samples.

The freshwater alewife inhabits the open lake waters during most of the year and moves to shallow beach areas and ponds to spawn in late spring and early summer (May through July) (6). Spawning takes place at night over a sandy or gravelly bottom. Eggs are demersal, essentially non-adhesive, and hatch in 3-6 days at water temperatures of 60-72°F (8). The larvae remain on the spawning ground and move slowly to deep water. At the end of the first growing season the young alewives are 2-3 inches long.

Gizzard shad spawn in freshwater probably during the day over sand, gravel, and boulder shoals (6). Spawning occurs during early June and July at temperatures of 63-73°F. Eggs are small, adhesive, and generally hatch in 36-95 hours, depending on water temperature. The newly hatched larvae are about 5.2 mm long. Young gizzard shad grow relatively slowly and are usually 1-2 inches long at the end of their first year.

Comparisons of the 2 years' data show several interesting points. First, except for the very high densities of postlarvae at one beach station (18) during run 6 (June 21-July 2) in 1976, 1975 produced a much stronger year class of clupeids than 1976 (Figure 6, App. Table B-3; Figure 7, App. Table B-4). Second, there was a distinct pulse of larval clupeids during both years beginning in June, peaking mid-June, and completed by mid-July. Since eggs hatch within 2-4 days, these pulses, as shown on the graphs, indicate that spawning over three of the sampled contours, (0-to 6-ft., 6-to 12-ft., and 12-to 18-ft.) produced nearly all the clupeids collected during the two years.

Geographical variation was important in larval production (Figure 8, App. Table C-3, Figure 9; App. Table C-4). Transects 1 and 2 produced only one-half to two-thirds the number of fish produced at transects 5 and 6 in 1975, and again, except for very high densities at station 18 in 1976, the northern transects produced about one-quarter the larval clupeids of transects 5 and 6. The middle of the study area (transects 3 and 4) produced low numbers of larvae during both seasons, and the middle depths (12-to 24-ft.) produced smaller numbers of larvae than the shallowest or deepest contours.

Finally, although definite preferences for habitat appeared, the occurrence of clupeids at all locations and stations within the study area indicated their dominance and utilization of all waters of the area during the survey.

FIGURE 6 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL CLUPEIDS PER CONTOUR, WESTERN LAKE ERIE, 1975

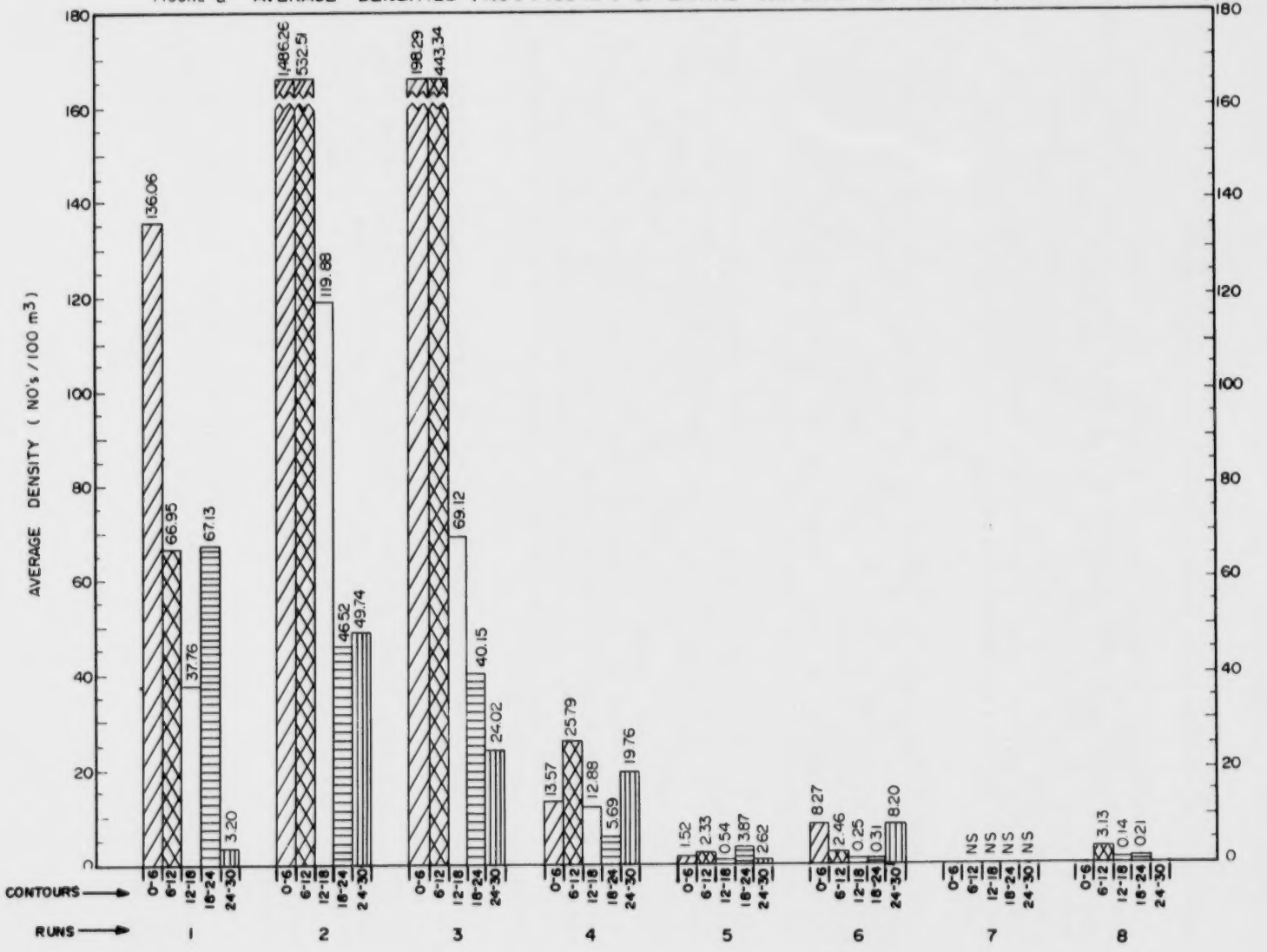


FIGURE 7 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL CLUPEIDS PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

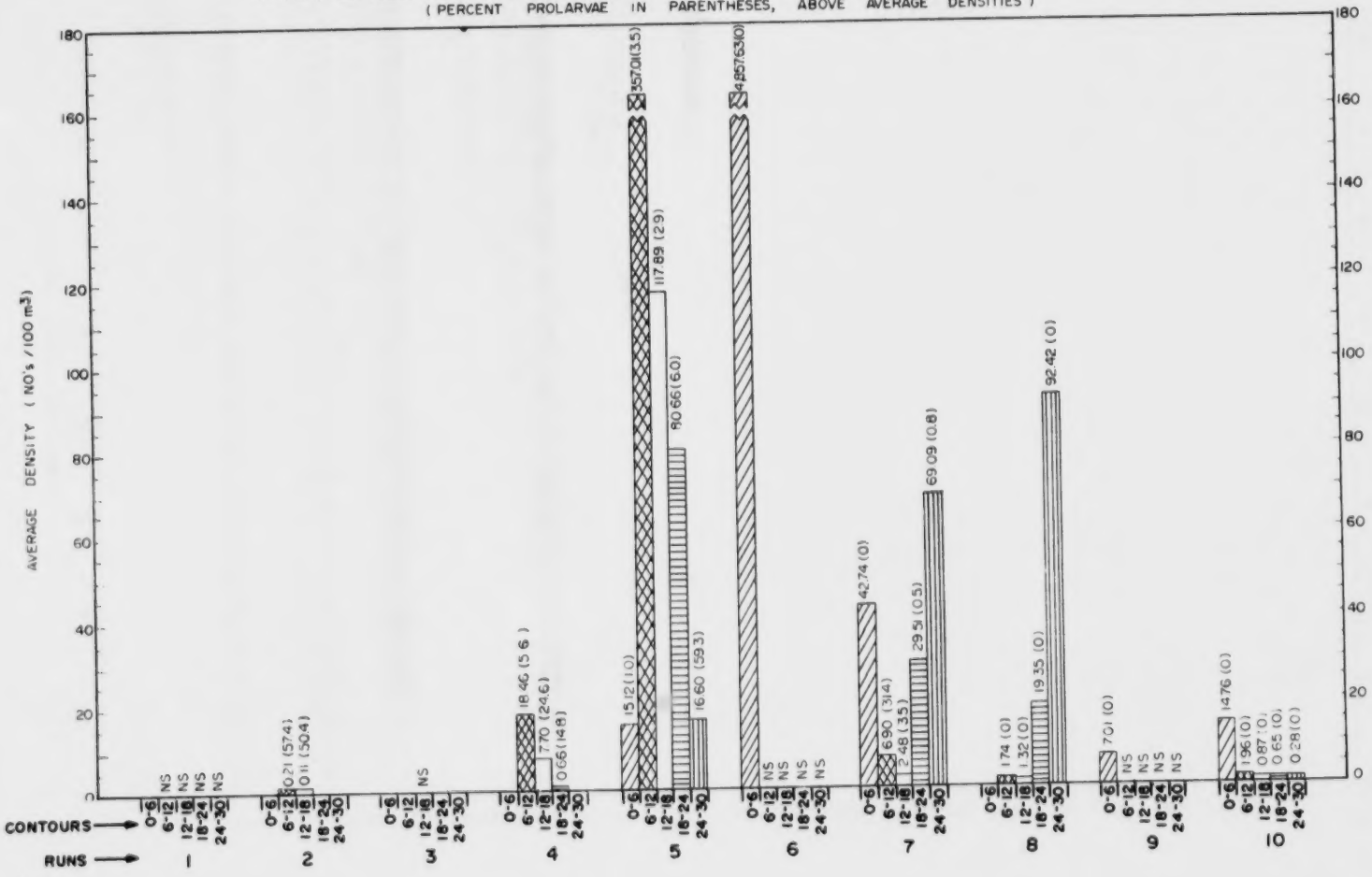


FIGURE 8 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL CLUPEIDS PER TRANSECT, WESTERN LAKE ERIE, 1975

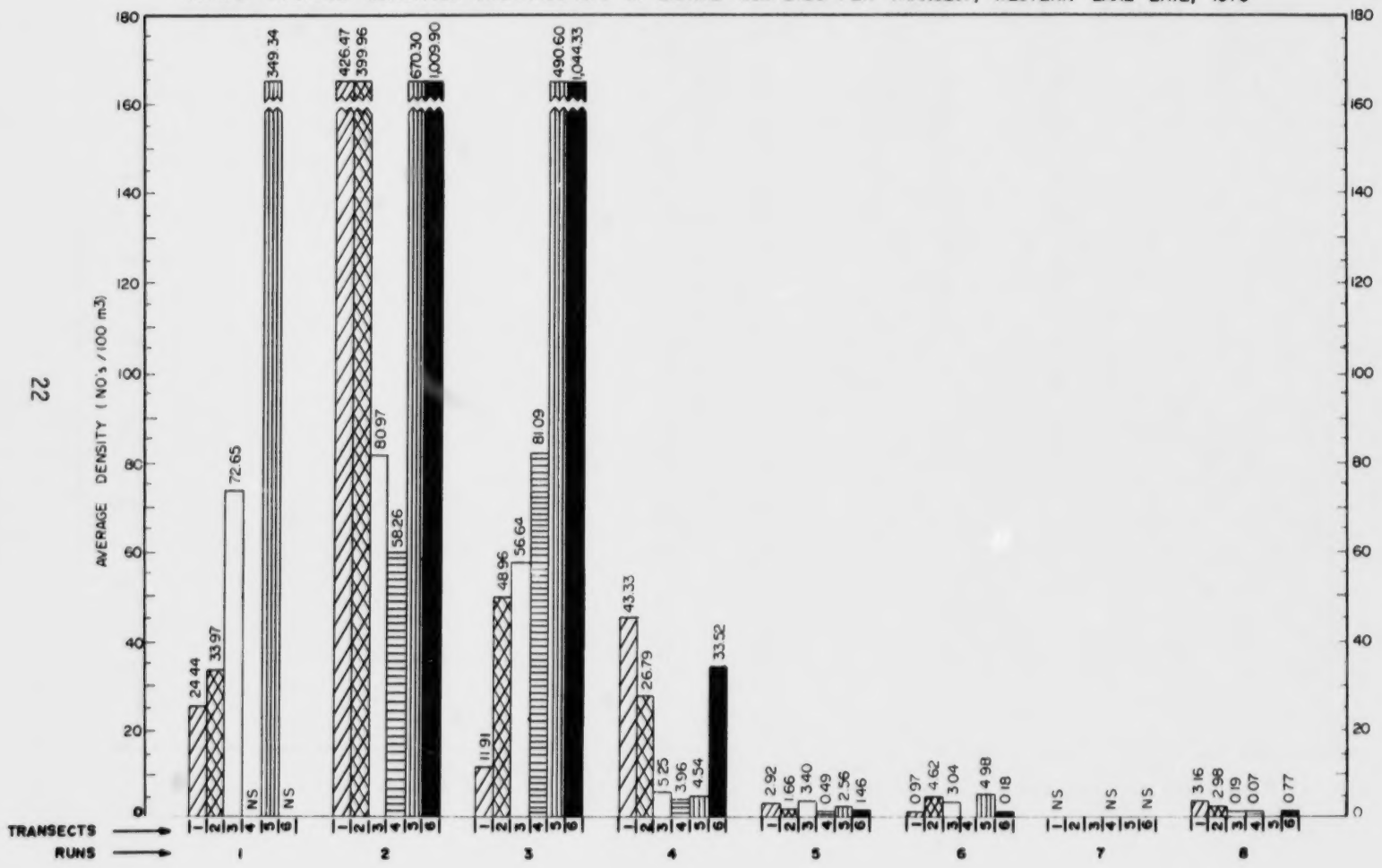
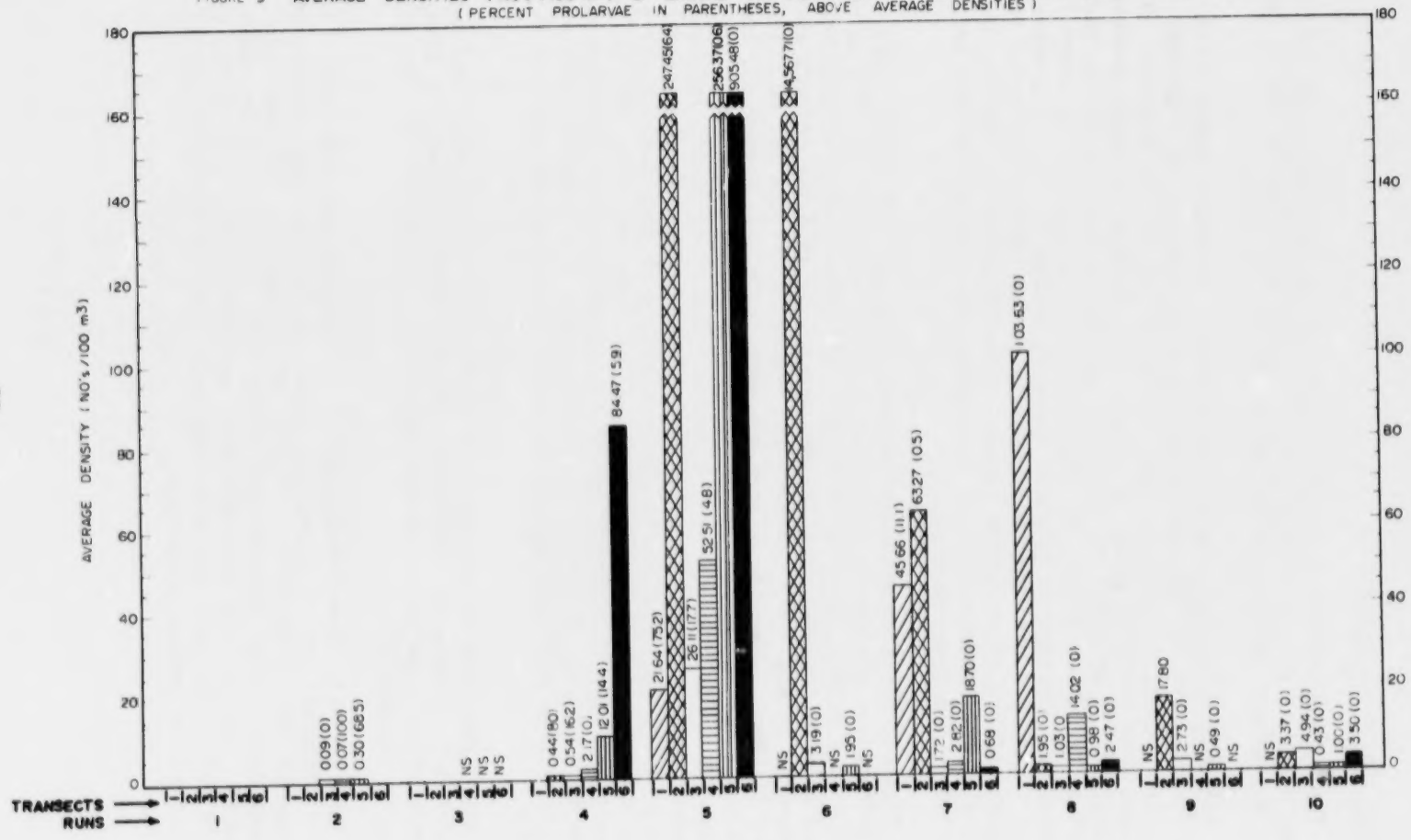


FIGURE 9 AVERAGE DENSITIES (NO's /100 m³) OF LARVAL CLUPEIDS PER TRANSECT, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



SHINERS (Notropis spp.)

The biology of the principal species of shiners collected during the 2-year study is not well described. Notropis atherinoides and N. hudsonius were the shiners identified most often during the study.

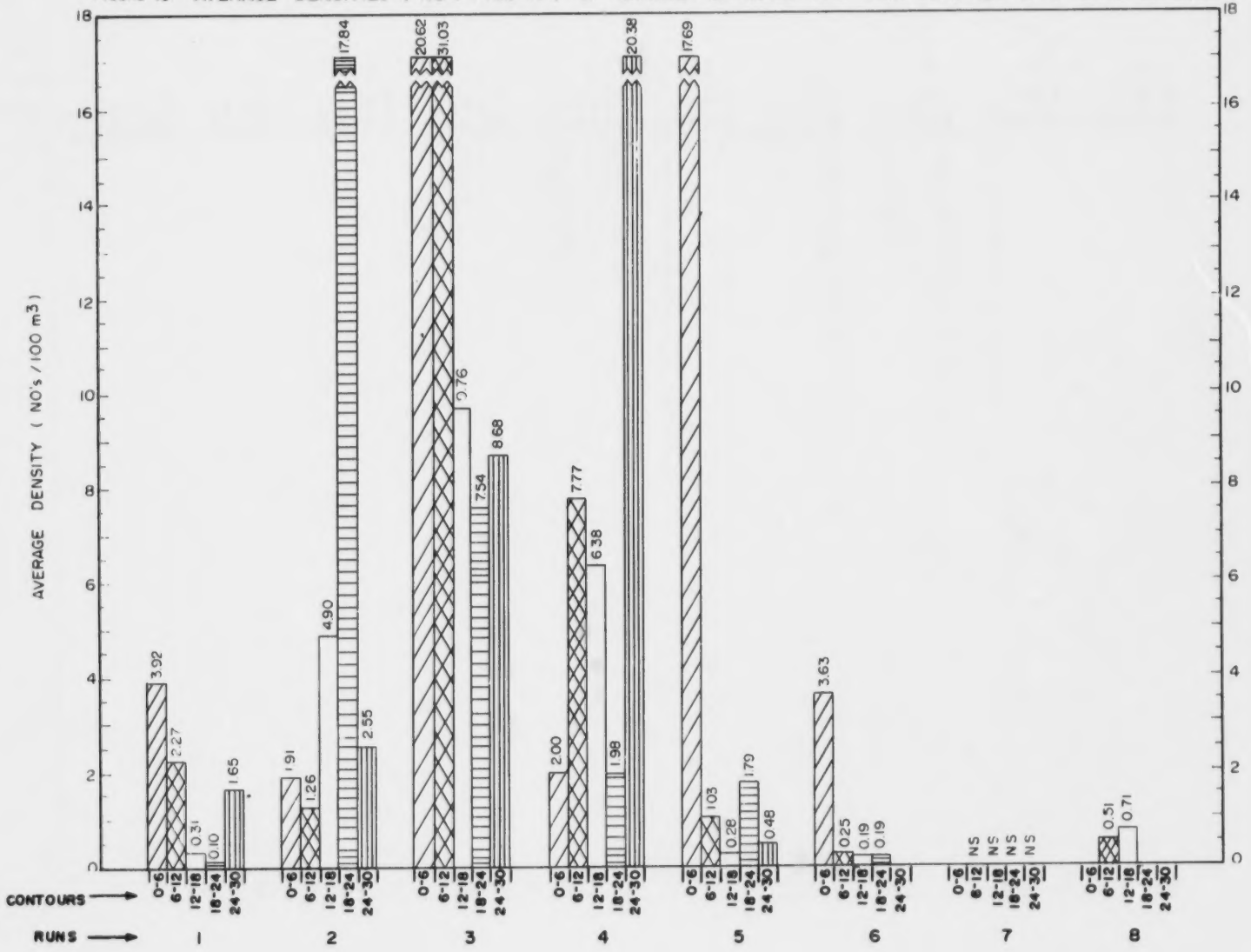
Notropis hudsonius, the spottail shiner, probably spawns first (May to June) and the emerald shiner, N. atherinoides, in midsummer (June and July). Spottail shiners spawn in the spring and early summer in the shallows over sandy or gravelly shoals (6). Because of depth preferences, the spottail is probably the dominant species in the 0-to 12-ft. nearshore waters of the study area. The emerald shiner is reported to spawn in midwater and may have an extended spawning season (6, 9). The emerald shiner probably contributed most heavily to the shiners collected in the offshore waters, later in the season. Identification to species was not routinely done because of their large abundance, so all shiners were reported as the genus Notropis.

Distinct differences appear between 1975 and 1976 shiner data. Whether the differences are due to individual species abundance in 1975 as compared to 1976 is a matter for more research. The shiners were very abundant, second only to clupeids in total abundance. In 1975 the shiners were well represented at all depth contours and transects (Figure 10, App. Table B-5; Figure 11, App. Table B-6; Figure 12, App. Table C-5; Figure 13, App. Table C-6). Production of shiner larvae was evident from run 2 (June 2-13) through run 5 (July 28-30) at all depths. The 12-to 18-ft. and 18-to 24-ft. contours produced the first pulse beginning in runs 2-4; then production in the 0-to 6-ft. and 6-to 12-ft. contours peaked in runs 3-6. Finally, the 24-to 30-ft. contour had many shiner larvae from runs 1-6. The extended shiner production is probably due to the spawning season differences among two or more species of Notropis. The data for 1975 supports this conclusion since they show many apparent pulses, such as one during run 5 on transects 1 and 2.

Most other species had only one major peak between run 2 and run 5 on transect 3-5. Figure 12 also shows that the southern transects produced the most shiners and produced them earlier in the season than the northern transects (Figure 12).

The 1976 data show trends similar to those in the 1975 data. The major differences are in abundance; about one-half as many shiners were produced in 1976 as in 1975. Finally, when comparing 1975 and 1976 transect data, larval shiners were again first abundant in the southern transects. During 1976 they were more abundant in the 6-to 12-ft. contour than in 1975. The 1975 and 1976 data both show the northward spread of spawning as the season progresses.

FIGURE 10 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL SHINERS PER CONTOUR, WESTERN LAKE ERIE, 1975



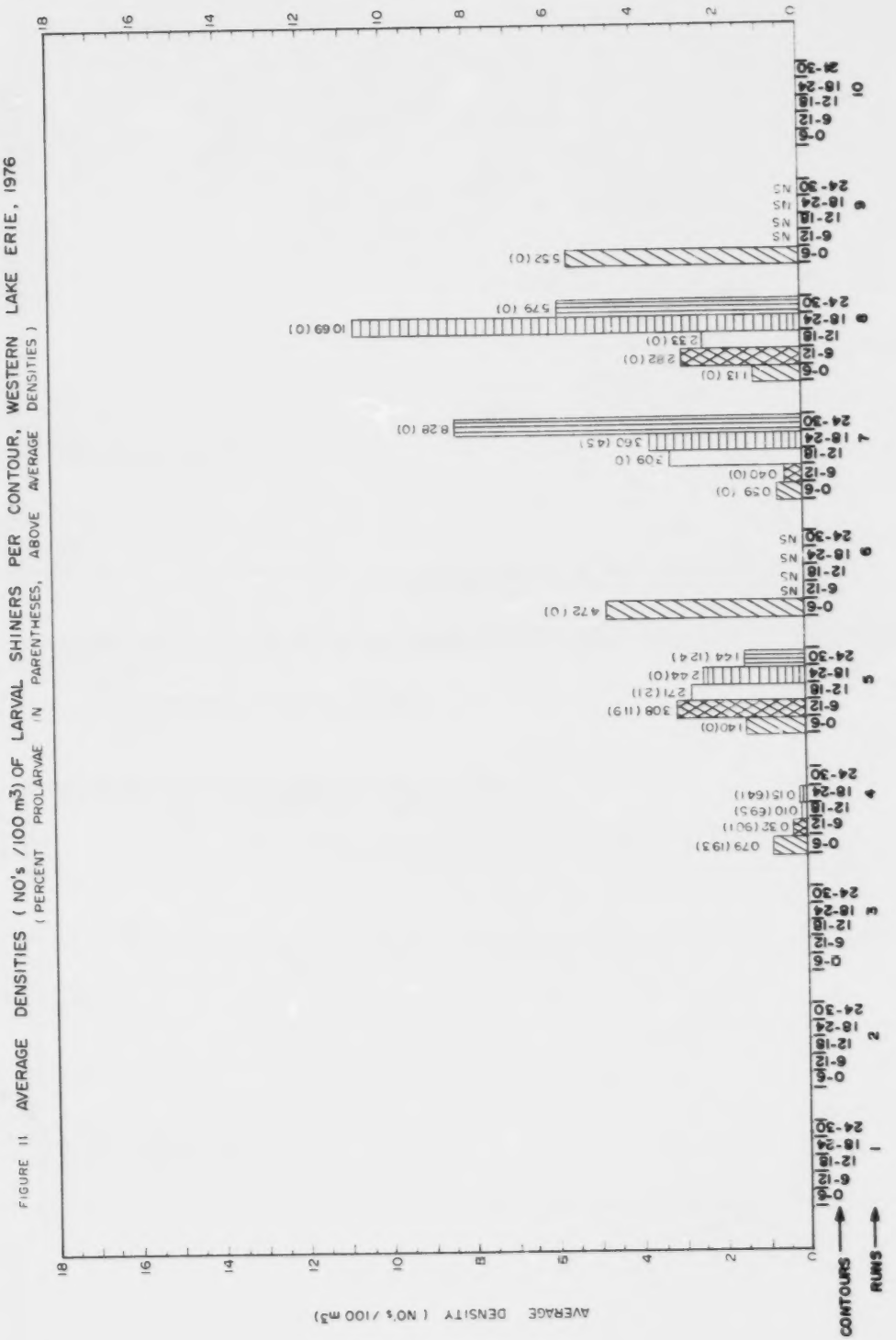


FIGURE 11 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL SHINERS PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)
AVERAGE DENSITY (NO's /100 m3)
CONTOURS
RUNS
0-6
6-12
12-18
18-24
24-30
NS
079 (193)
032 (901)
010 (695)
015 (641)
140 (0)
308 (119)
271 (21)
244 (0)
144 (124)
472 (0)
029 (0)
040 (0)
309 (0)
360 (43)
828 (0)
113 (0)
282 (0)
233 (0)
579 (0)
1069 (0)
552 (0)

FIGURE 12 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL SHINERS PER TRANSECT , WESTERN LAKE ERIE, 1975

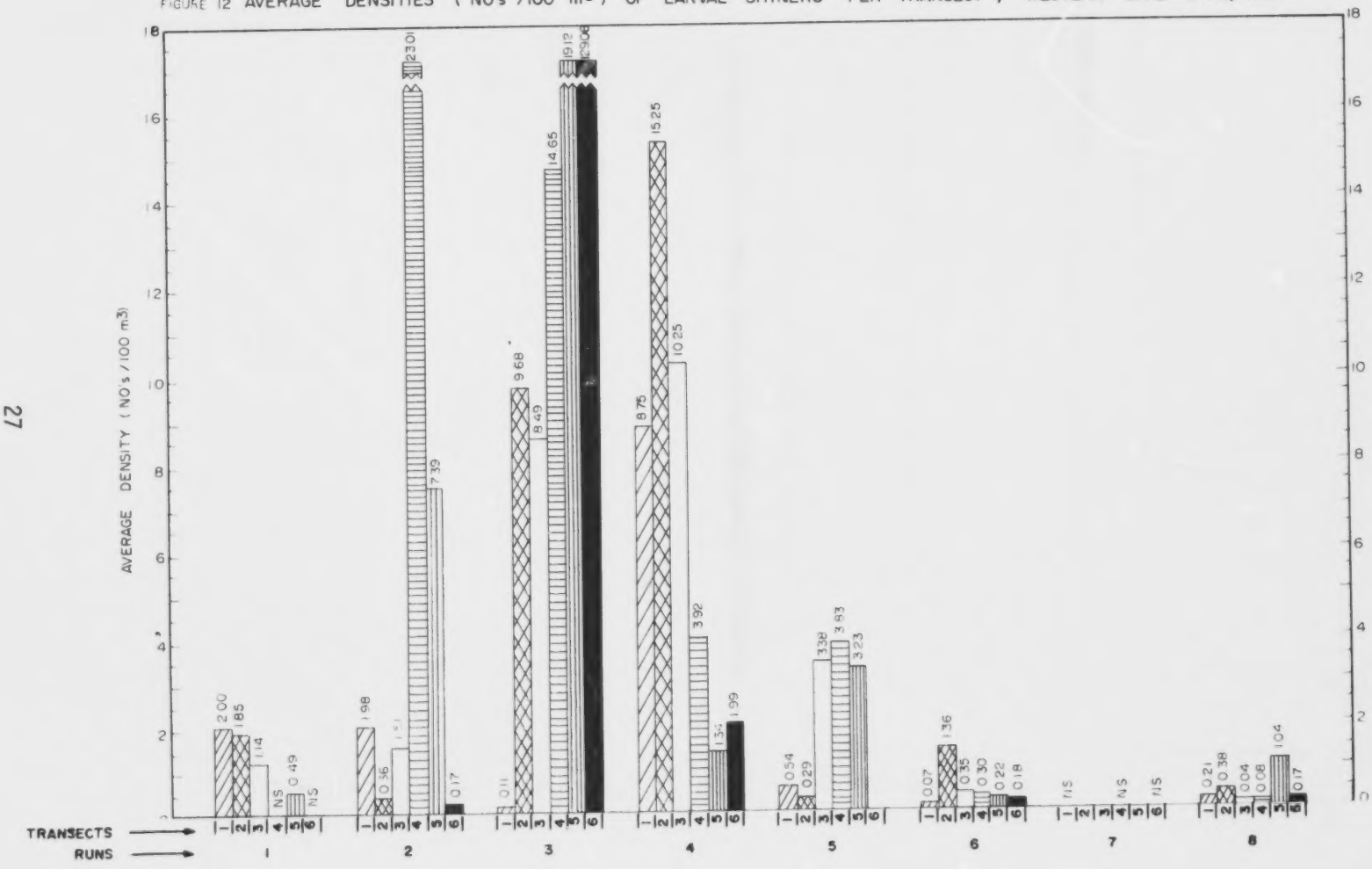
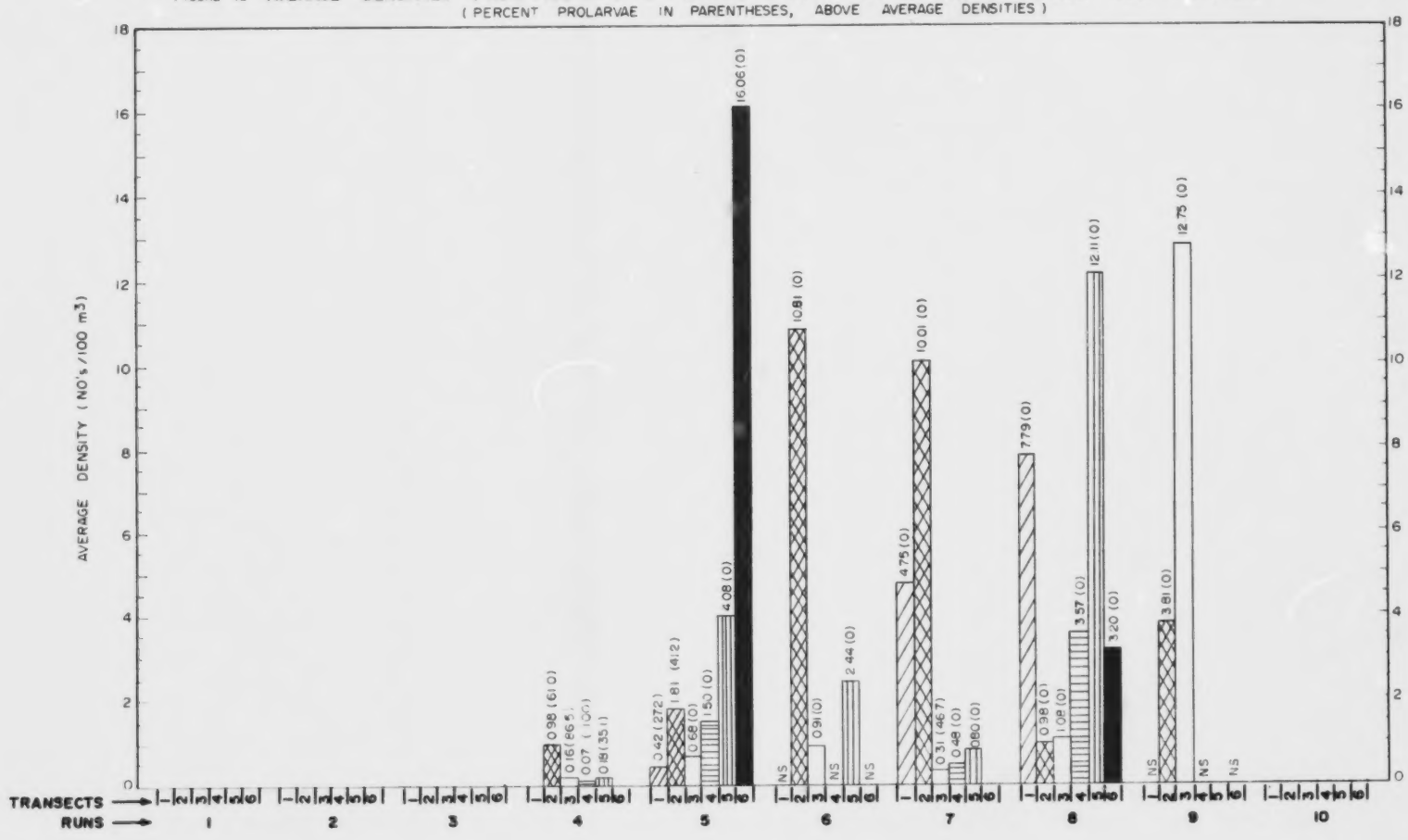


FIGURE 13 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL SHINERS PER TRANSECT, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



FRESHWATER DRUM (Aplodinotus grunniens)

The biology of the drum is not well documented, but spawning probably occurs in midsummer (June to July) at water temperatures of 70-75°F. The eggs hatch 25-30 hours after spawning. Eggs of the drum are notable in that they are bouyant and float at the surface because they contain a large oil globule in the eggs (6). Drum larvae grow rapidly during the first year and reach lengths of 5 inches or more.

In 1975 and 1976 freshwater drum spawned in early June and did not spawn thereafter. No larval drum were taken after August in 1975 or mid-July in 1976. In both years, most of the drum larvae were found in shallow water. The 0-to 6-ft. and 6-to 12-ft. contours of Lake Erie produced most of the drum in 1975 and the 6-to 12-ft. contour appeared to produce the highest densities of freshwater drum during 1976 (Figure 14, App. Table B-7; Figure 15, App. Table B-8).

Drum were present in low densities in the middle or northern portions of the study area (transects 1-4) and reached their greatest densities on transects 5-6 in the southern portion (Figure 16, App. Table C-7; Figure 17, App. Table C-8). The drum densities at Station 17 (near Woodtick Peninsula) were two (1976) to ten (1975) times greater than those on transect 5 during both years of the study. Many freshwater drum eggs were sampled at Station 15 and 17 in the 1976 survey during run 5 (June 7-18) at the same time the larvae were caught. The larvae at this time were also very small, essentially an egg with eyes and fins.

FIGURE 14 AVERAGE DENSITIES (NO's / 100 m^3) OF LARVAL FRESHWATER DRUM PER CONTOUR, WESTERN LAKE ERIE, 1975

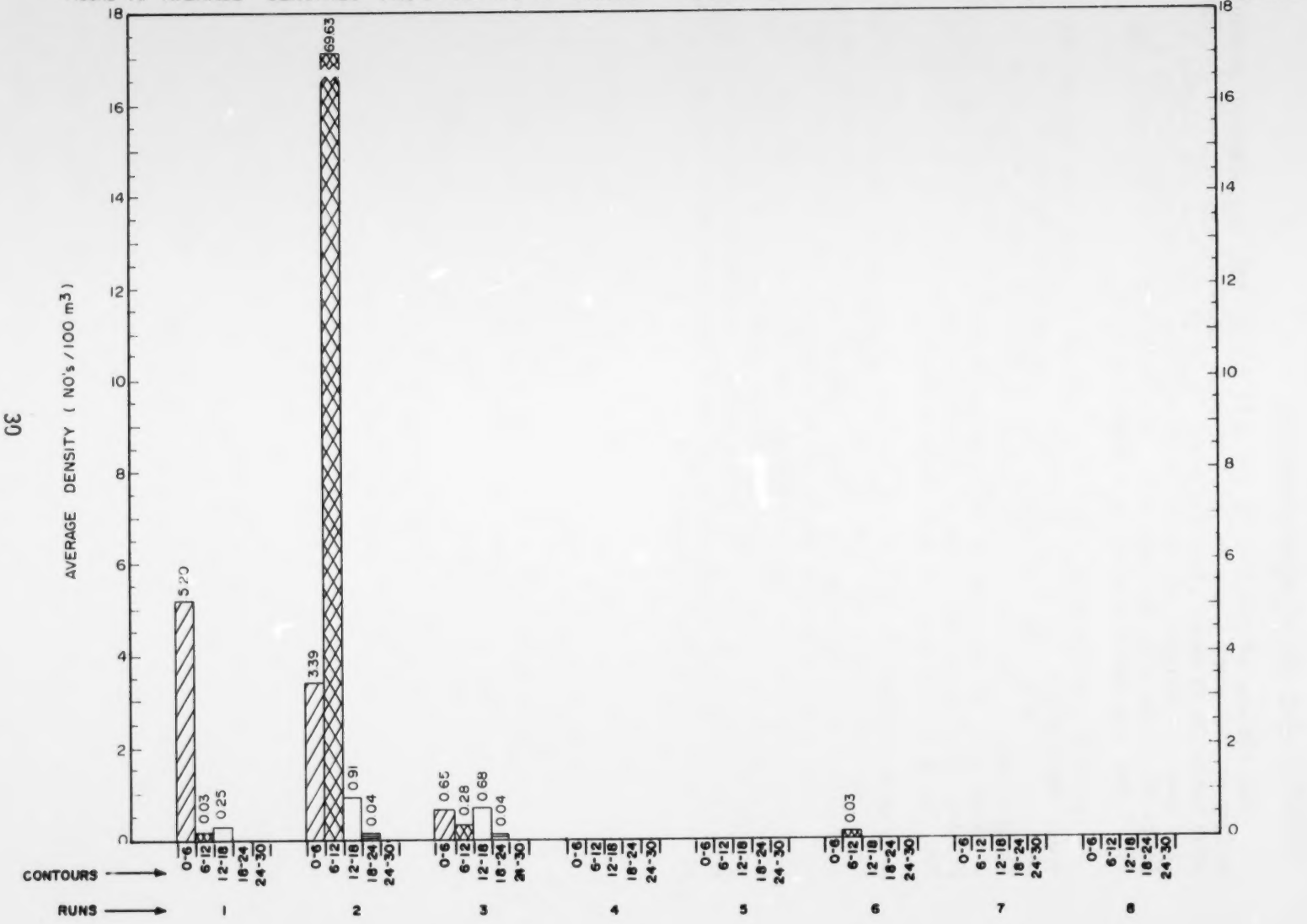


FIGURE 15 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL FRESHWATER DRUM PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

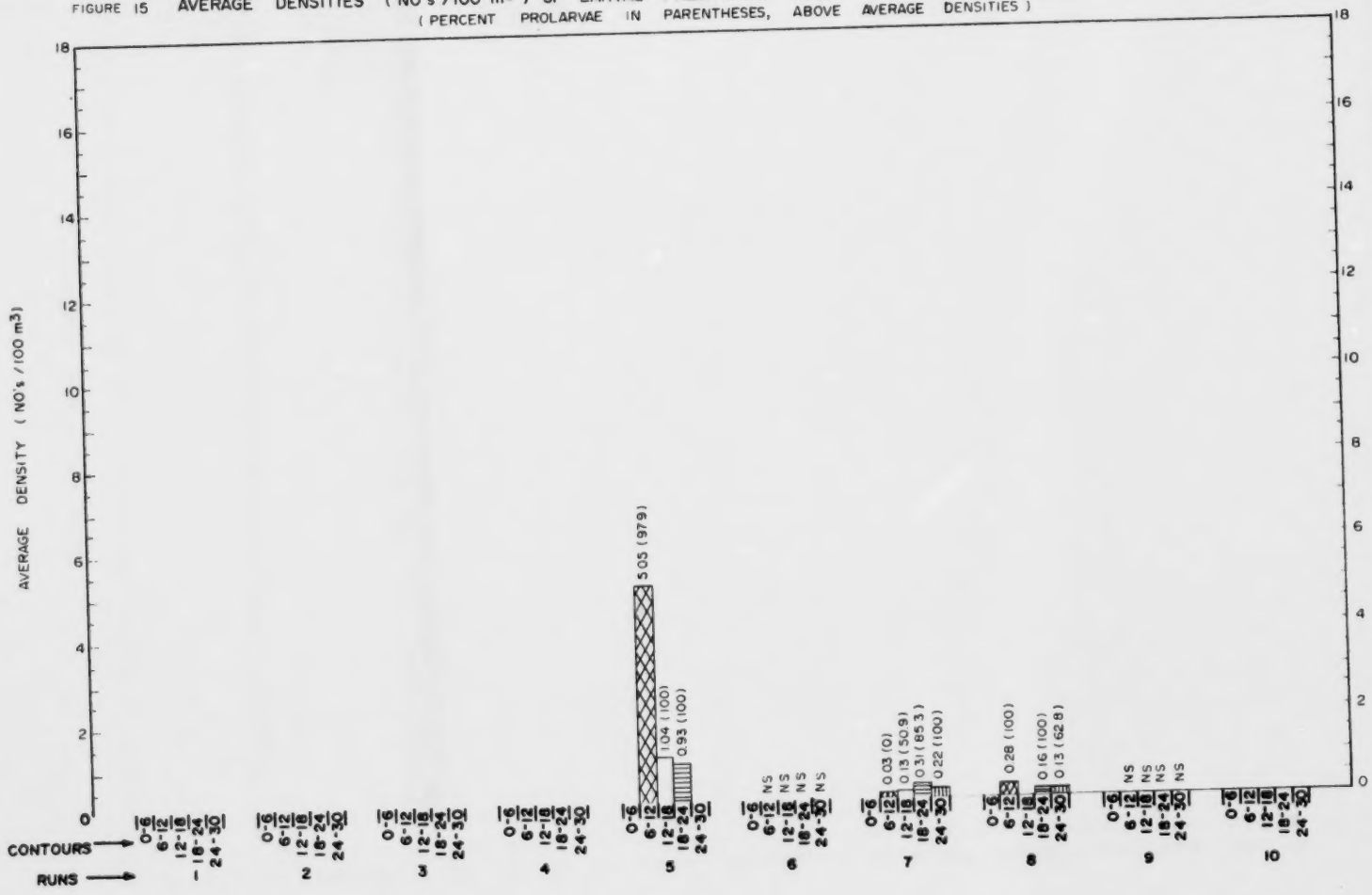


FIGURE 16 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL FRESHWATER DRUM PER TRANSECT, WESTERN LAKE ERIE, 1975

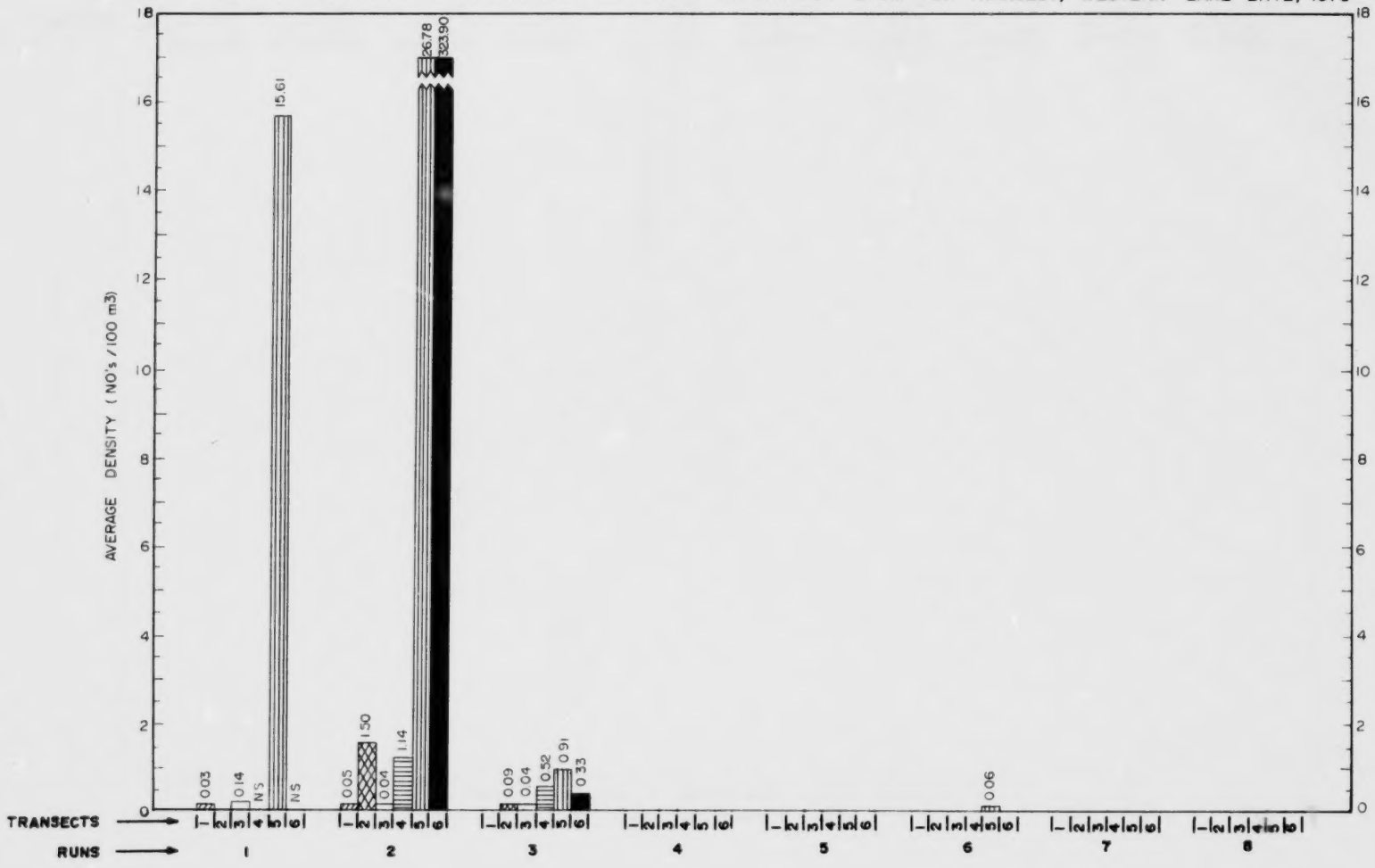
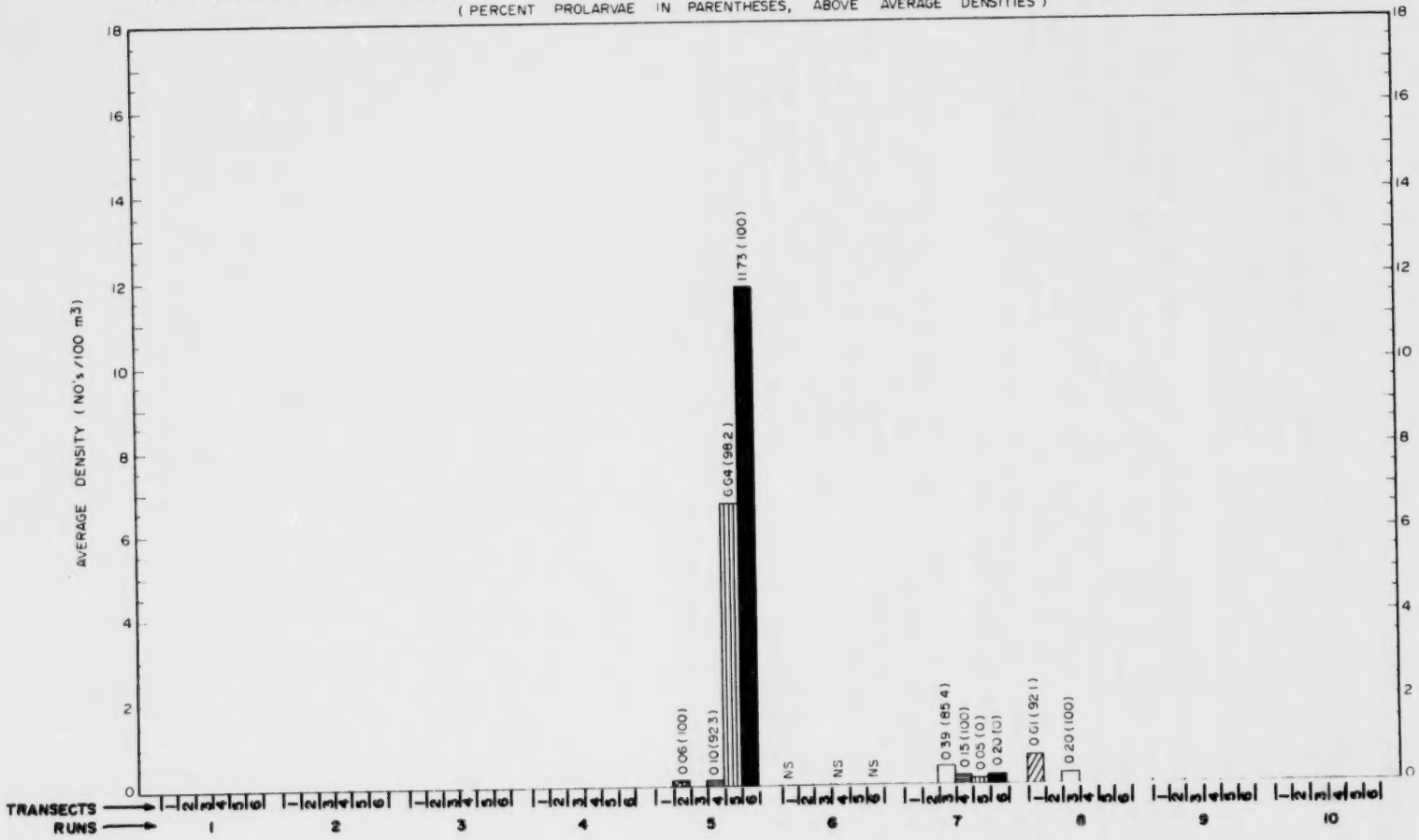


FIGURE 17 AVERAGE DENSITIES (NO's / 100 m^3) OF LARVAL FRESHWATER DRUM PER TRANSECT, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



CARP (Cyprinus carpio)

Carp spawn in late spring and early summer. Adult fish move into shallow, weedy areas in lakes or streams, and spawning occurs when water temperatures reach 62°F (6). Under normal conditions eggs hatch from 3-6 days after spawning. Growth of larvae is rapid, and carp reach 5-7 inches in length during their first growing season.

During the 2-year study period, carp larvae were found in low numbers in the shallow zones of the study area (Figure 18, App. Table B-9; Figure 19, App. Table B-10). Only in 1976, during run 8 (June 19-30), were larvae found in relatively large numbers in the offshore waters (24-to 30-ft. contour). During both years of the study small numbers of larvae were found in the 0-to 6-ft. and 6-to 12-ft. contours in the northern end of the study area. Larvae probably occurred as early as mid-May in 1976 and peaked by June during both seasons.

Larval carp were not found in high densities in either year in the study area probably because the habitat was not suitable for spawning. The northern part of the study area (transects 1, 2, and 3) produced nearly all the carp collected and they may come from the Pte. Mouille area and the Huron River rather than in-lake spawning (Figure 20, App. Table C-9; Figure 21, App. Table C-10). In 1975 most of the carp larvae were found in tows that also picked up quite a bit of extraneous vegetation. In 1976 several backwater areas were sampled and contained extremely high numbers of carp larvae. Significant carp recruitment to Lake Erie probably occurs in the backwater areas and not in Lake Erie proper.

FIGURE 18 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL CARP PER CONTOUR, WESTERN LAKE ERIE, 1975

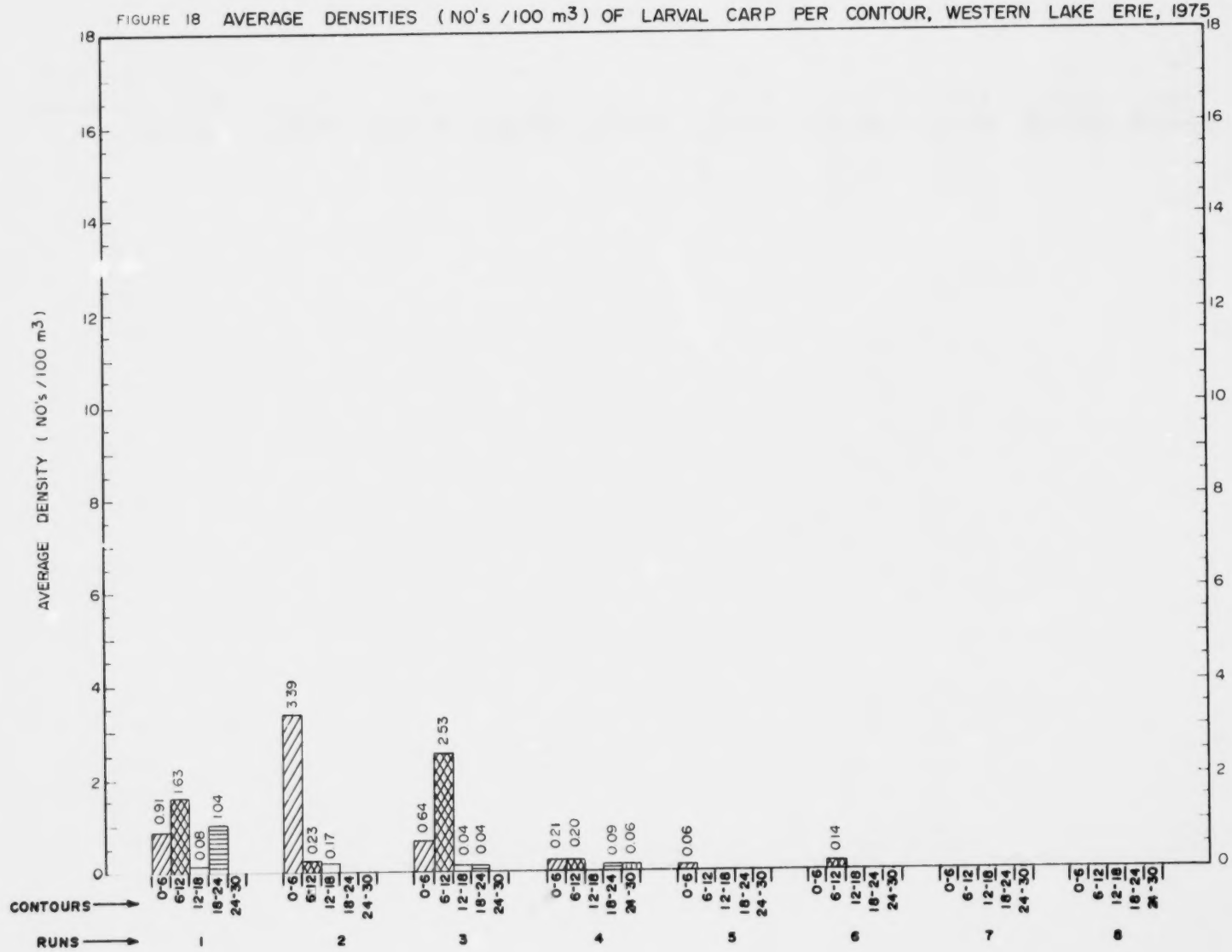


FIGURE 19 AVERAGE DENSITIES (NO's / 100 m^3) OF LARVAL CARP PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

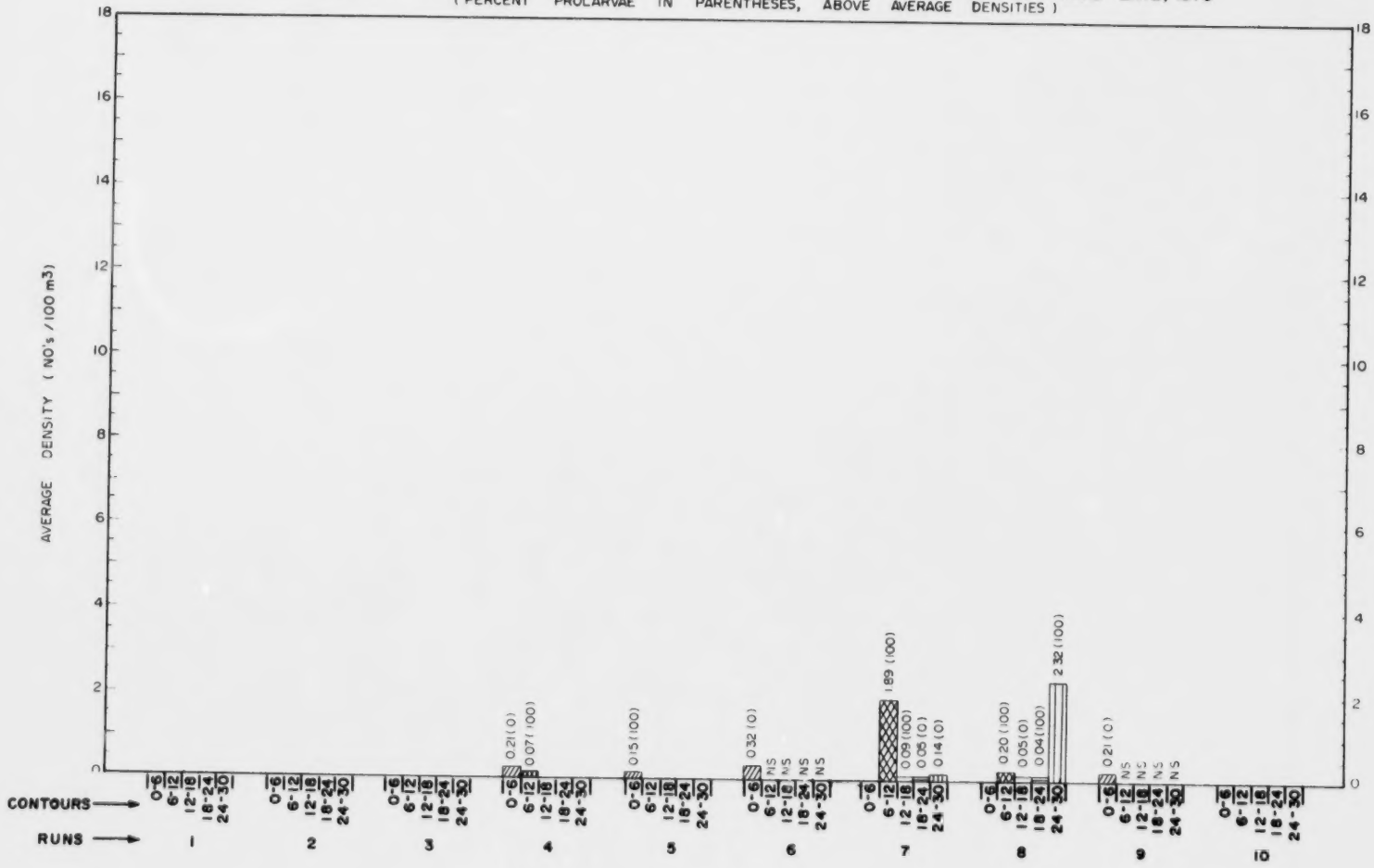


FIGURE 20 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL CARP PER TRANSECT, WESTERN LAKE ERIE, 1975

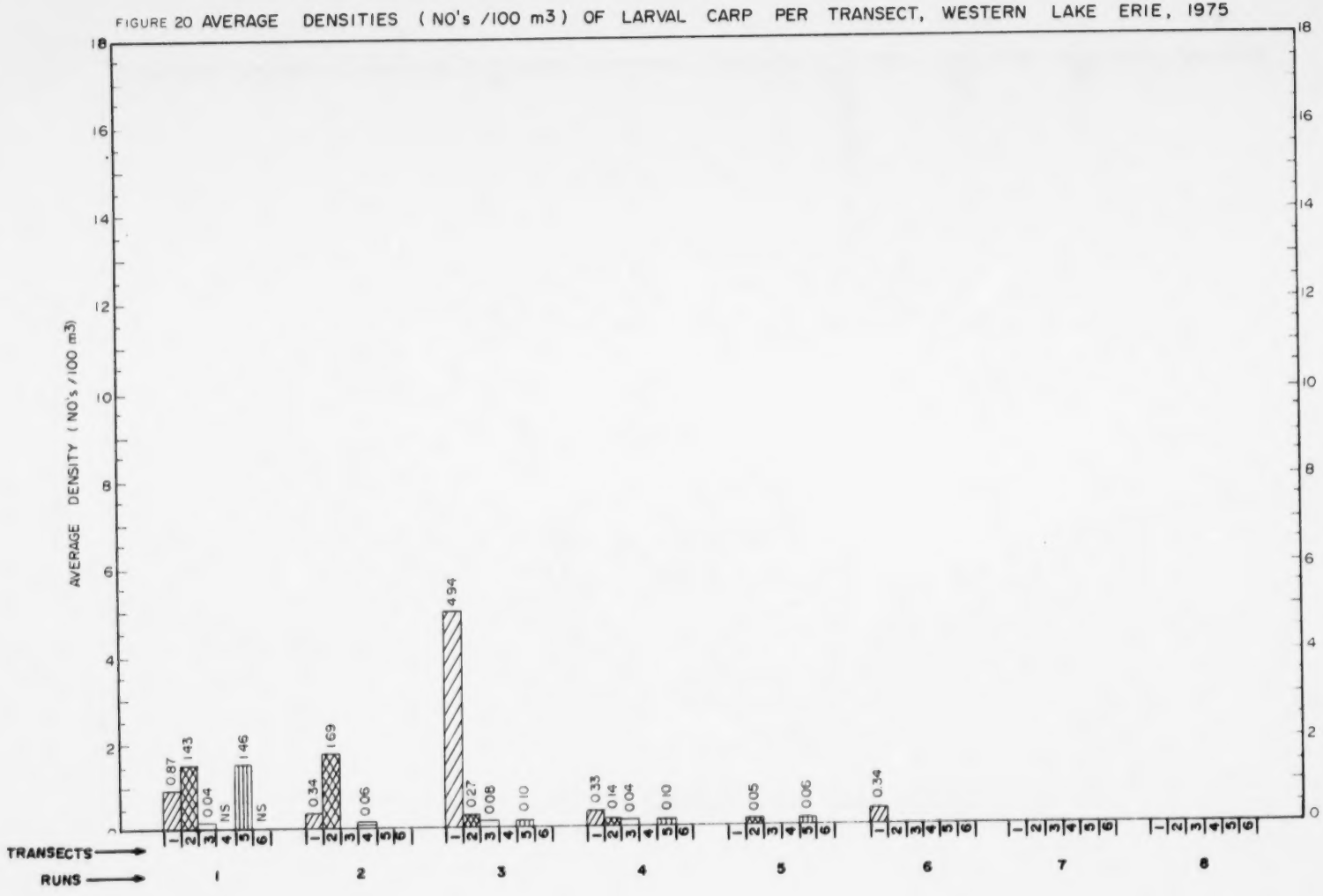
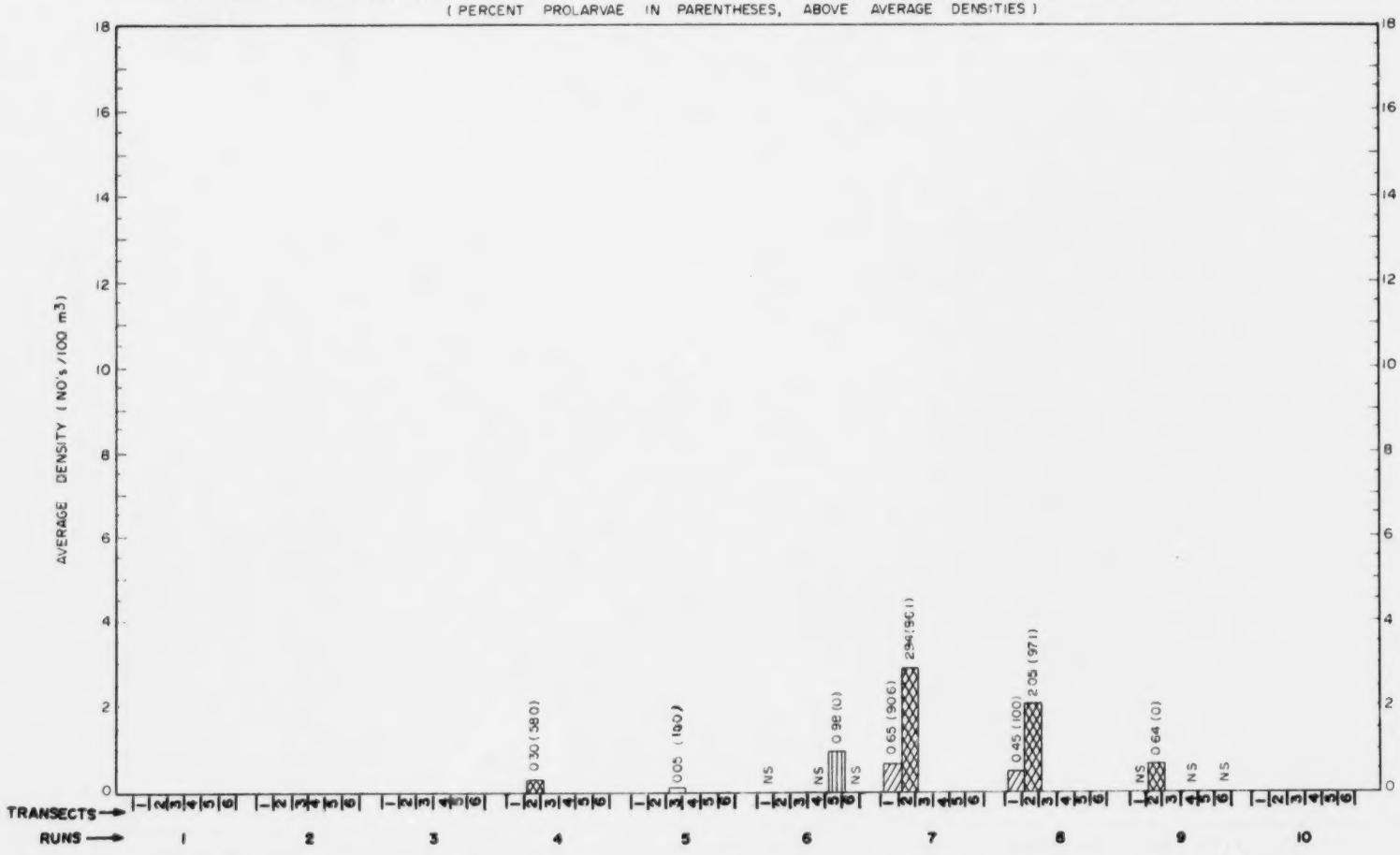


FIGURE 21 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL CARP PER TRANSECT, WESTERN LAKE ERIE, 1976

(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



RAINBOW SMELT (Osmerus mordax)

Depending on the weather, smelt spawn early after ice leaves the lake from March to May. Spawning temperatures in streams are from 50-59°F (6), but smelt spawn in open lakes as well, probably at similar temperatures (10). Eggs are demersal and adhesive and attach to the bottom substrate shortly after spawning. Eggs hatch in 2-3 weeks and are about 5 mm long. Smelt larvae grow rapidly and may be 2 inches or more long by August.

In 1975 high densities of rainbow smelt were taken during run 1 (June 2-13) in the 6-to 12-ft., 12-to 18-ft. and 18-to 24-ft. contours (Figure 22, App. Table B-11; Figure 23, App. Table B-12). During run 2 (June 16-24) smelt were found in the 0-to 6-ft. contour (2.91/100 m^3) but were 2-3 times more dense at the 6-to 12-ft. and 12-to 18-ft. contours. Larval smelt were taken only occassionally after run 2 and in very low numbers (less than 0.3/100 m^3). Larval smelt (late post larvae) were taken at the 6-to 12-ft. contour during run 8 (July 19-30), but very few individuals were noted (0.10/100 m^3).

During 1975 larval smelt were found in greatest densities in the 24-to 30-ft. contour with the 12-to 18-ft. and 18-to 24-ft. contours also important. Production was much higher in the northern end of the study area (transects 2 and 3) than in the southern end (transects 4 and 5) (Figure 24, App. Table C-11; Figure 25, App. Table C-12). In 1975 nearly all larvae taken were postlarvae. Obviously the early spawning was missed in 1975. These postlarvae may have been dispersed by wave and current action or migrated to deeper water from the shallower water.

In 1976 concentrations of larval smelt were again most dense in the 24-to 30-ft. contour. During run 2 (April 26-May 7), only very low densities of smelt were found in the nearshore (less than 12 ft.) waters of the study area. More complete data for 1976 depict a probable pattern of spawning. It appears that during April 26 - May 7 the 24-to 30-ft. contour is the most important producer of larvae indicating possible inputs from the Detroit River or offshore spawning. By run 4 (May 21-June 4) the 12-to 18-ft. and 18-to 24-ft. contours produce greater smelt densities than the 24-to 30-ft. contour. These observations indicate two or more spawning periods or pulses in the study area.

A comparison of larval fish production in 1975 and 1976 indicates that 1975 may have produced a much stronger year-class of rainbow smelt than 1976. In 1975 run 1 corresponds to run 5 in 1976. In 1975 densities of smelt are 30 times those found at the same contour during run 5 in 1975.

FIGURE 22 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL RAINBOW SMELT PER CONTOUR, WESTERN LAKE ERIE, 1975

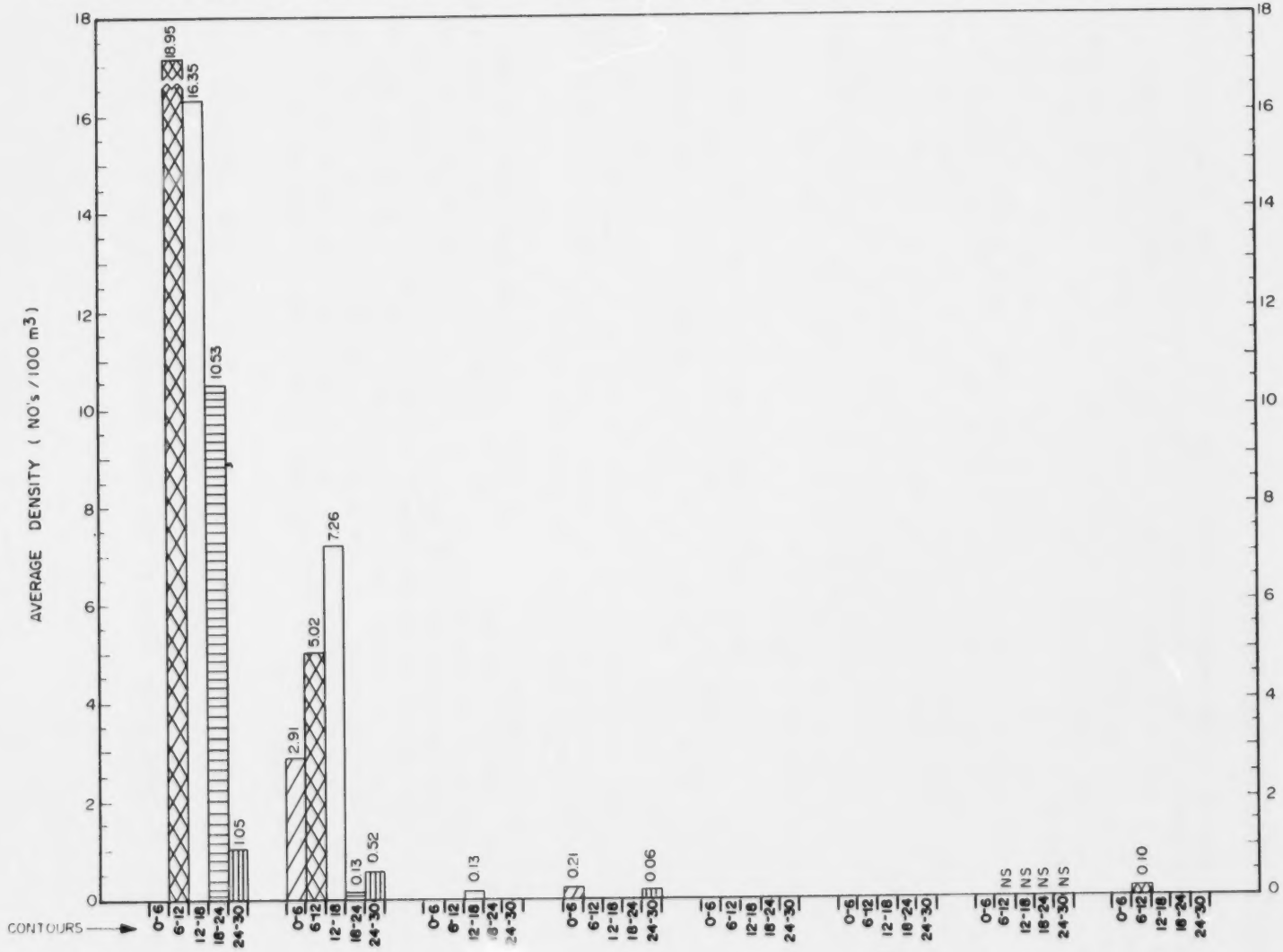


FIGURE 23 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL RAINBOW SMELT PER CONTOUR, WESTERN LAKE ERIE, 1976

(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

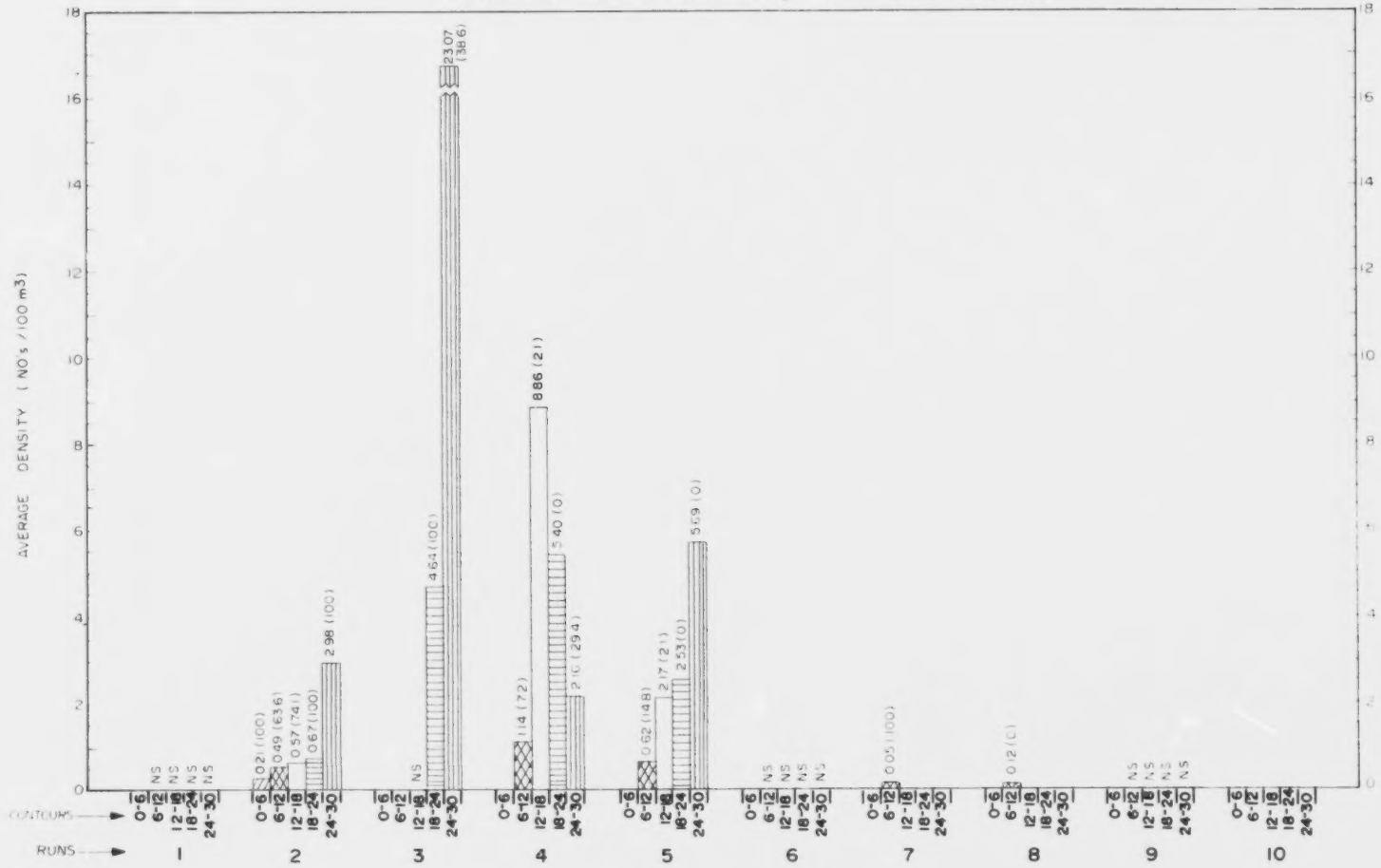


FIGURE 24 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL RAINBOW SMELT PER TRANSECT, WESTERN LAKE ERIE, 1975

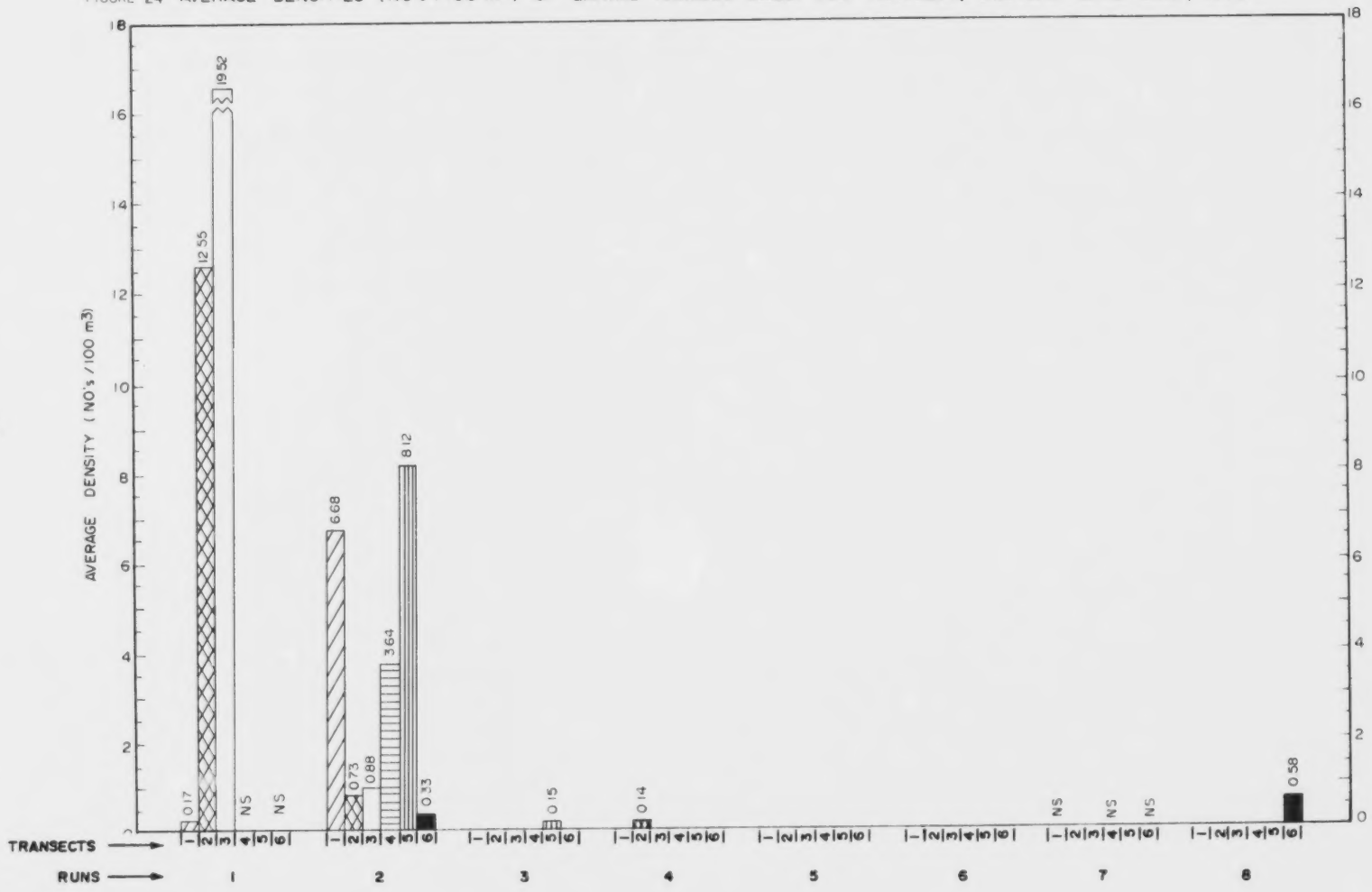
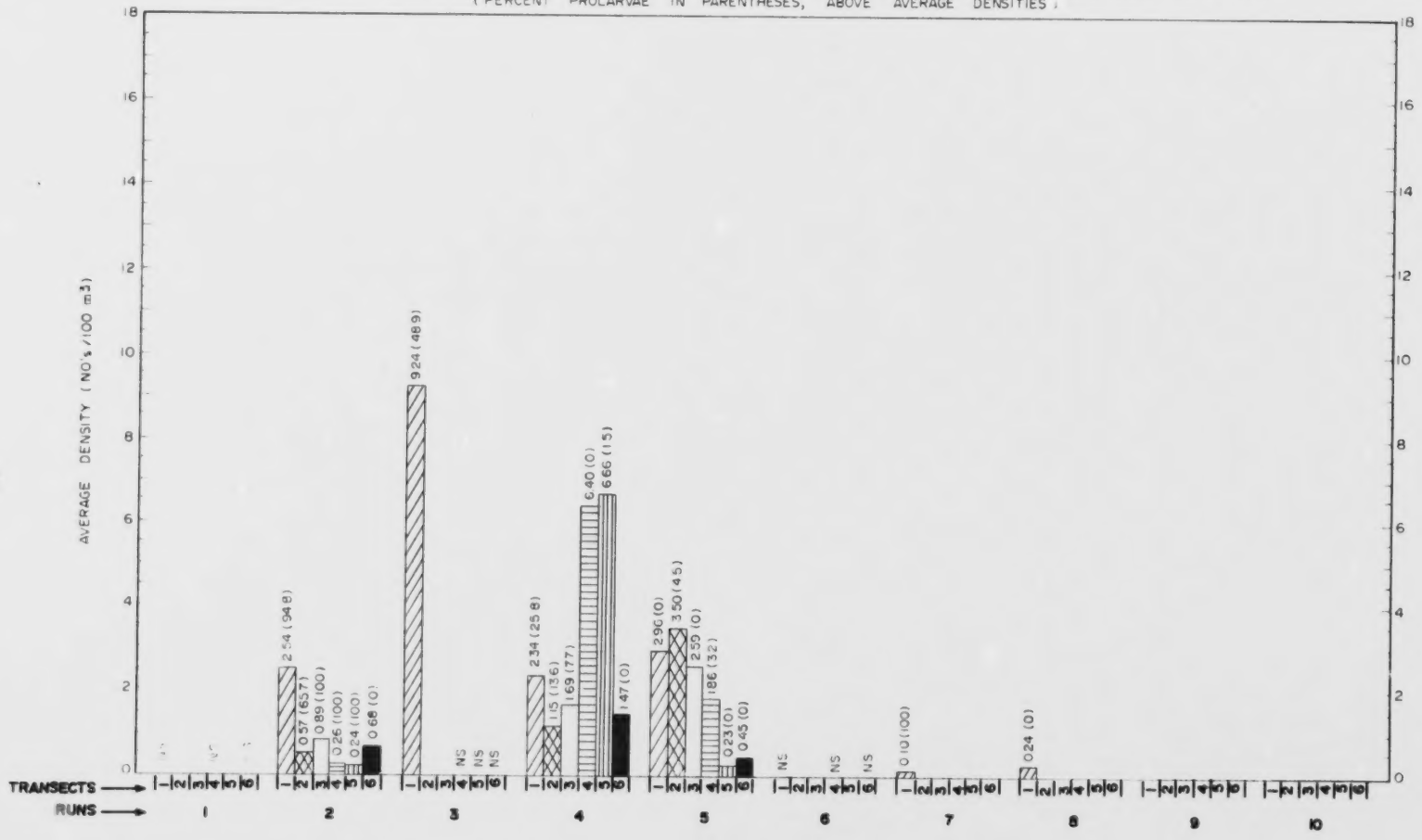


FIGURE 25 AVERAGE DENSITIES (NO's / 100 m3) OF LARVAL RAINBOW SMELT PER TRANSECT, WESTERN LAKE ERIE, 1976

(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



WHITE BASS (Morone chrysops)

White bass spawn in the spring and adults move inshore when water temperatures reach 55-60°F. Spawning takes place in daylight, usually near the surface, and may last 5-10 days. Eggs are adhesive and sink to become attached to gravel, boulders, or vegetation in the spawning areas. Hatching occurs in 46 hours at 60°F, and the newly hatched larvae are from 3.5 to 13.5 mm long (6). Growth is rapid and white bass in Lake Erie reach total lengths of 5-6 inches by the fall of their first year (6).

During the 1975-76 study period, several seasonal differences in the data were apparent. More white bass were produced in 1975 than in 1976. 1975 densities of larval white bass were 4-18 times greater than in 1976. The 0-to 6-ft., 6-to 12-ft., and 12-to 18-ft. contours produced more than 95% of the larval white bass in 1975, while the 18-to 24-ft. and 24-to 30-ft. contours appear to have greatest density of larvae in 1976 (Figure 26, App. Table B-13; Figure 27, App. Table B-14). Sampling problems during run 6 may have influenced these results.

In 1975 and 1976 white bass were not collected in large numbers in the northern transects (Figure 28, App. Table C-13; Figure 29, App. Table C-14). The southern transects 5 and 6 were by far the greatest producers of white bass in the study area.

Production of white bass larvae was highest during June in both years but, 1976 production appears to be spread out from run 4 (May 21-June 4) through run 7 (July 5-16) with no real peak or pulse. If a pulse did occur in 1976, it would have had to occur during run 6 (June 21) when samples were collected only on the 0-to 6-ft. contour.

FIGURE 26 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL WHITE BASS PER CONTOUR, WESTERN LAKE ERIE, 1975

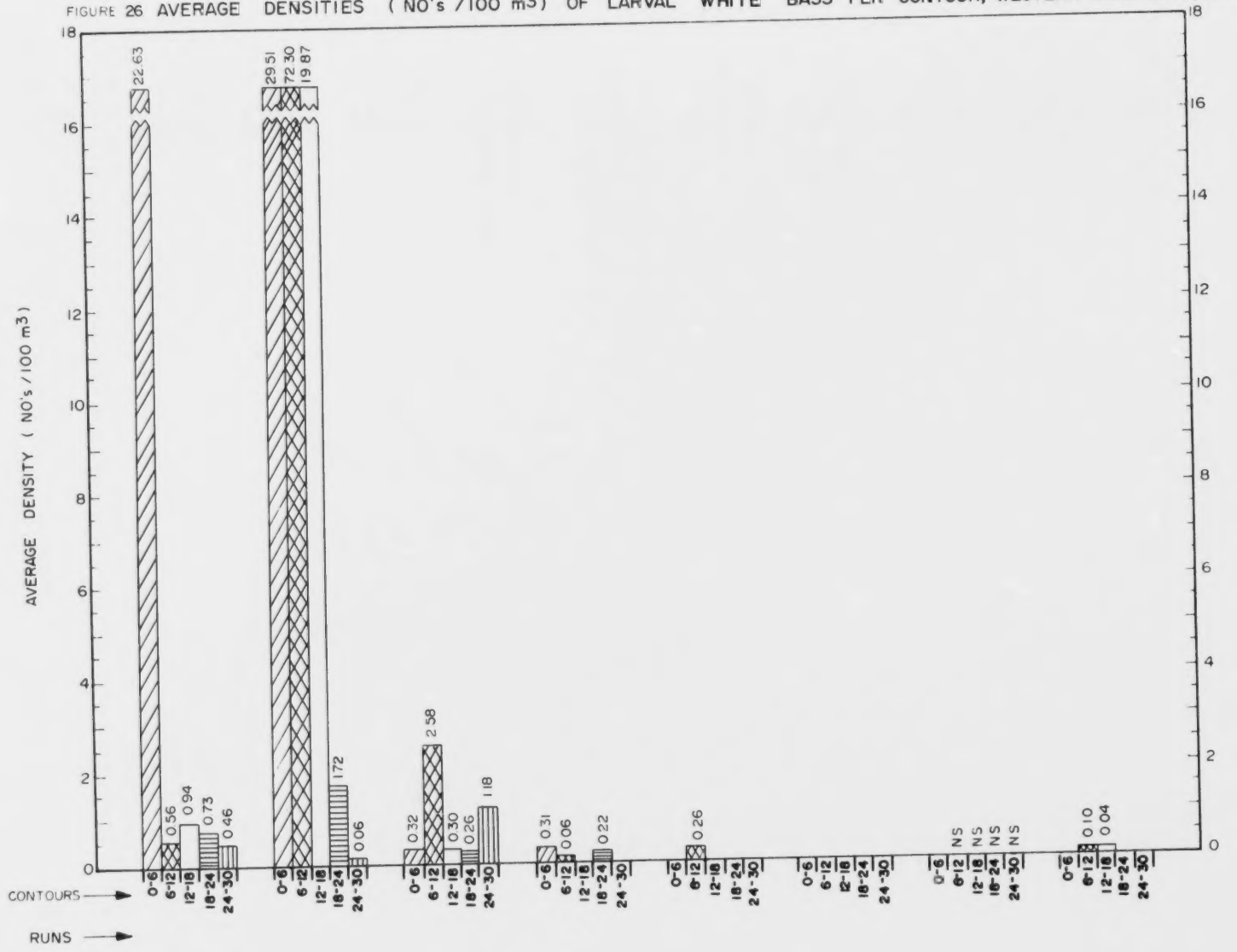


FIGURE 27 AVERAGE DENSITIES (NO's /100 m3) OF LARVAL WHITE BASS PER CONTOUR, WESTERN LAKE ERIE, 1976
(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)

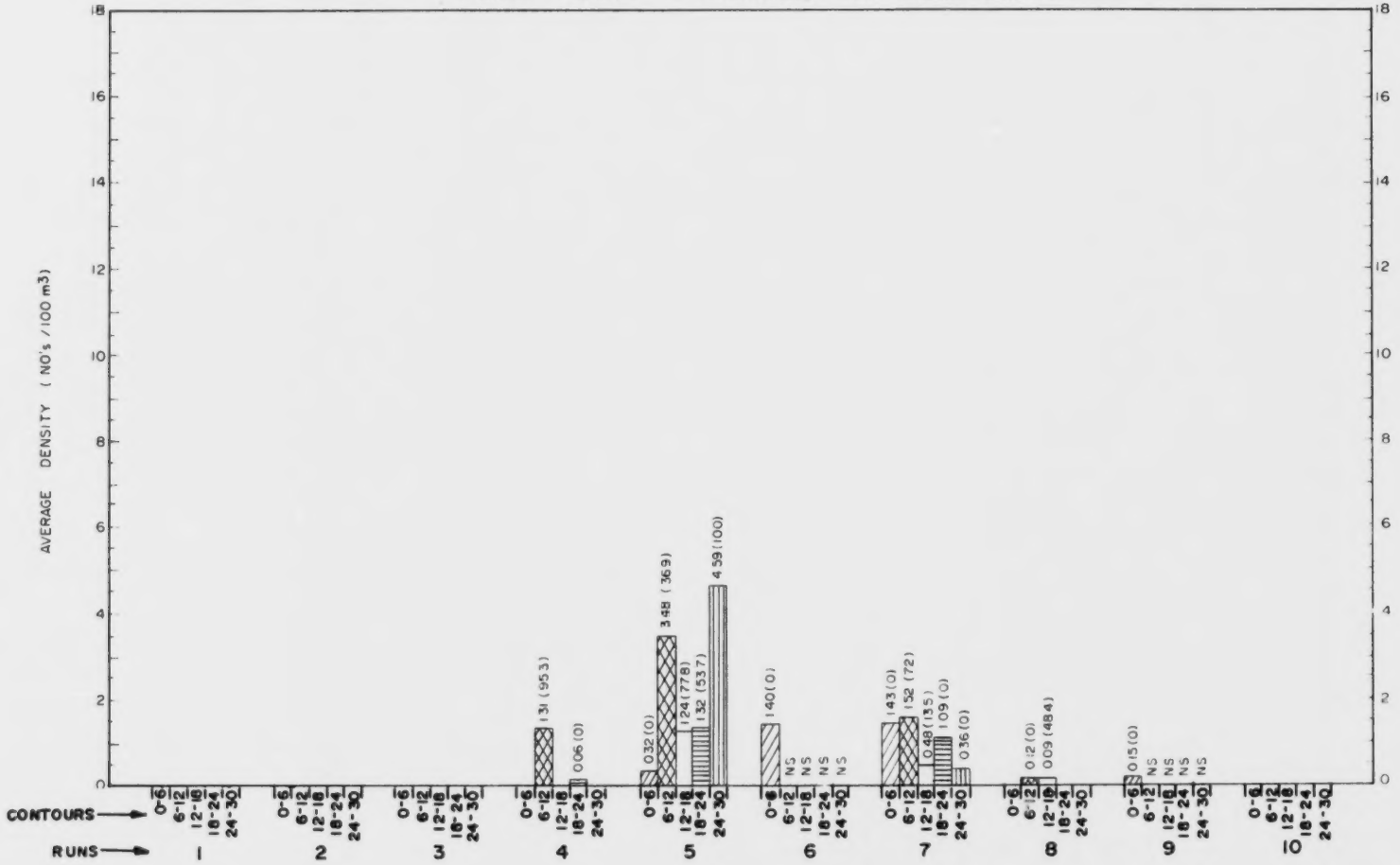


FIGURE 28 AVERAGE DENSITIES (NO's /100 m^3) OF LARVAL WHITE BASS PER TRANSECT, WESTERN LAKE ERIE, 1975

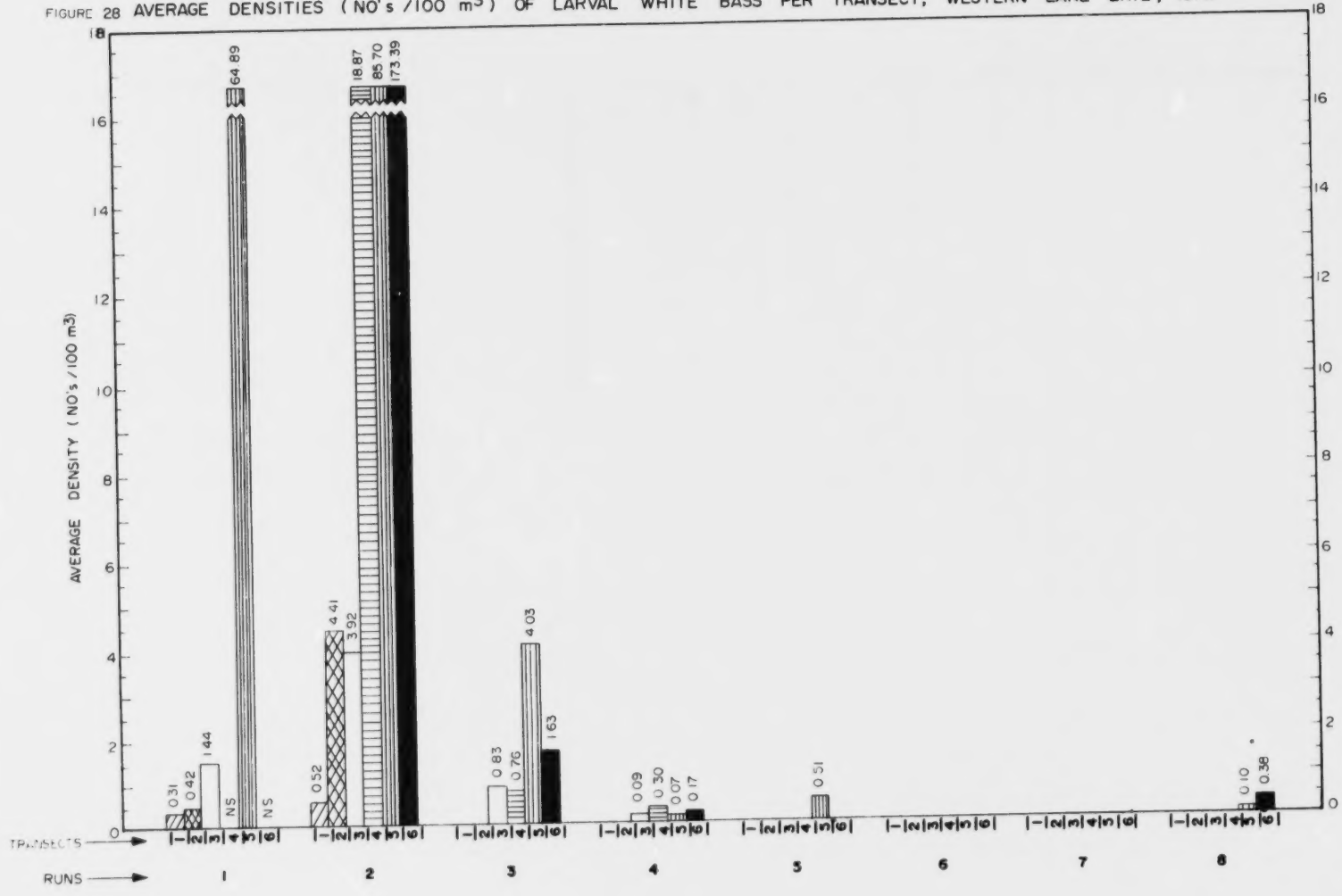
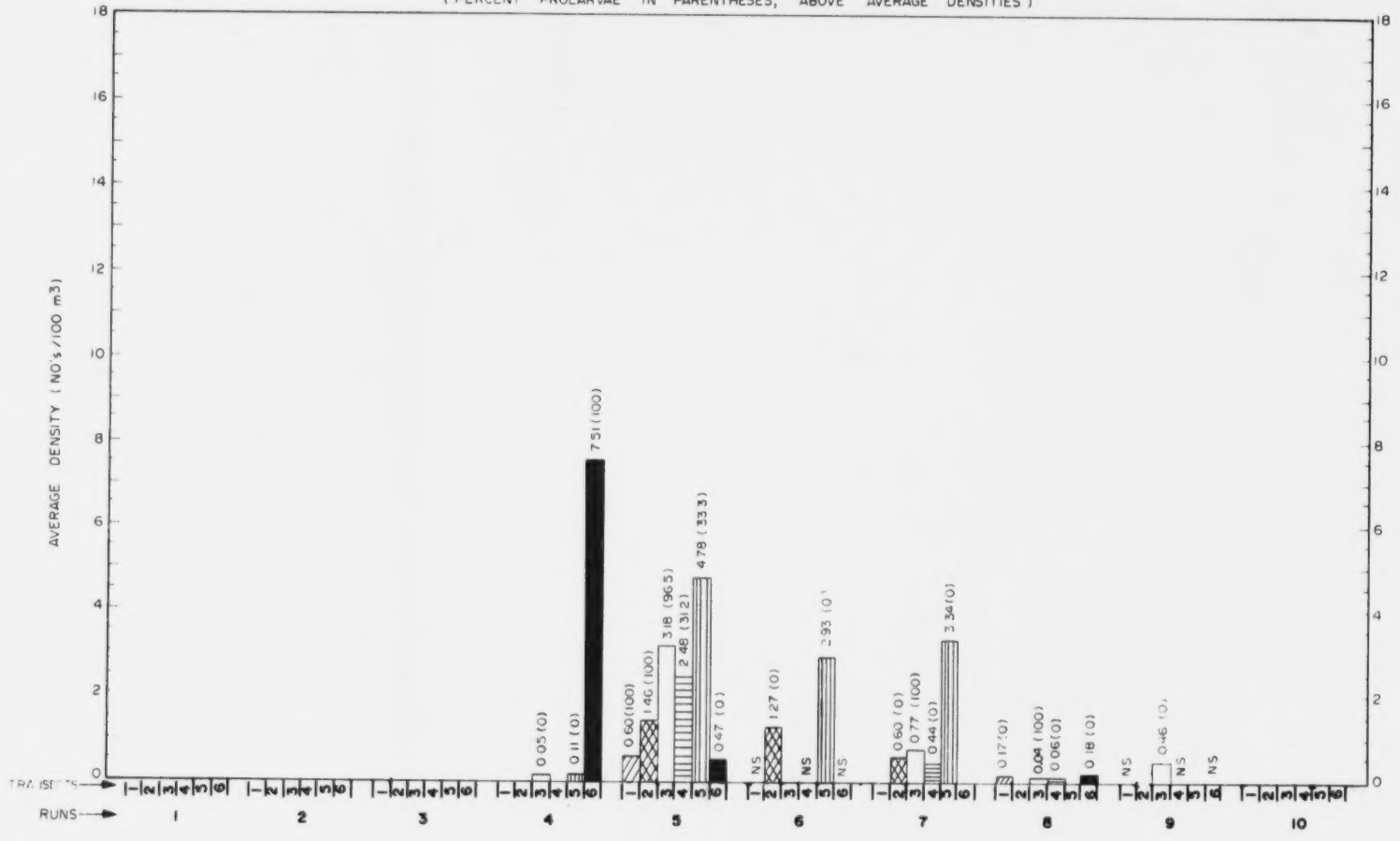


FIGURE 29 AVERAGE DENSITIES (NO' /100 m3) OF LARVAL WHITE BASS PER TRANSECT, WESTERN LAKE ERIE, 1976

(PERCENT PROLARVAE IN PARENTHESES, ABOVE AVERAGE DENSITIES)



MISCELLANEOUS SPECIES

Several additional species were found during the study, but they did not occur often enough or in great enough numbers to make a significant contribution to the collection (Appendix D).

Larvae of the logperch, Percina caprodes, were found in both 1975 and 1976. They were found throughout the Michigan waters of the western basin, although highest densities occurred in the southern portion of the lake (up to 46/100 m^3 at station 20 in run 2, June 16-24, 1975). They showed neither a surface or bottom or a contour preference. Logperch larvae were present in the earliest samples in 1975 (June 2) and first occurred in run 2 (April 26-May 7) in 1976. None were captured after run 8 (July 19-30) in 1976 and run 6 (August 11-14) in 1975. Spawning appeared to occur first in the southern waters and two weeks later in the northern waters.

Larvae of darters, Etheostoma sp. were found in run 4 (May 21-June 4) and run 8 (July 19-30) in 1976, in very low numbers, and from June 30-August 14 in 1975. Over the two seasons they were found on all transects except near the mouth of the Detroit River. No depth-contour preference was apparent.

Larval brook silversides (Labidesthes sicculus) were found during both seasons. They were uncommon and were found on runs 3 and 4 (June 30-July 14) in 1975, and runs 7, 8, and 9 (July 5-August 2) in 1976. They were generally found in the 0-to 6-ft. contour and only in the northern part of Michigan waters.

Larval sunfish (Lepomis spp.) were found in very low numbers from runs 2 and 4 (June 2-14) in 1975 and runs 4-8 (May 21-July 19) in 1976. Sunfish larvae were found in the 0-to 6-ft. and 6-to 12-ft. contours.

Crappie (Pomoxis spp.) were found in very low numbers in run 2 (June 16-24) in 1975 and in runs 4-7 (May 21-July 16) in 1976. They were found in both northern and southern parts of the lake. However, in the northern area of the lake in 1975 they were found only at the station furthest offshore in the 18-to 30-ft. contour. They were found in shallower water only once, at station 14, (6-to 12-ft. contour) in the southern part of the lake.

Larval suckers (Catastomus spp.) were found throughout the lake during runs 1 and 2 (June 2-24) in 1975 and runs 2-8 (April 26-July 19) in 1976.

Larval northern pike (Esox lucius) were found in 1975 and possibly larval muskellunge (Esox masquinongy) were found in 1976 during one sampling run each year. They were found in the 0-to 6-ft. and 6-to 12-ft. contours.

Only one channel catfish larvae was identified at station 19, in the 0-to 6-ft. contour in 1975. Numbers were probably low because tows were not made in the vicinity of appropriate spawning habitat.

Bass larvae (Micropterus sp.) were found at the beach stations 18 and 20 at the 0-to 6-ft. contour, in 1975. Occurrence of this species was much less than expected; none were captured in the 1976 sampling tows.

Larvae of the banded killifish (Fundulus diaphanus) were tentatively identified from 1976 during run 2. They were sampled at the offshore stations (2 and 3) near the mouth of the Detroit River. The presence of this fish in deep waters was unexpected although they could have been washed to these offshore waters. Natural populations of Fundulus are found in the quiet water areas of Lake Erie.

Surface vs. Bottom Distribution of Frequently Occurring Species

Differences between surface and bottom distributions of selected species were tested for significance at the 5% level by run (sampling period), by transect and with all -amples. Yellow perch showed no overall statistically significant preference for either the surface or the bottom. However during run 2 (April 26-May 7) in 1976 there were significantly more larvae in the bottom waters. The significance may in part be due to the greater numbers of larvae found during this period.

Smelt indicated no overall surface-bottom preference, nor was there a transect difference. On runs 4 and 5 (1976, May 21-June 18) smelt were significantly higher in the bottom samples. Most of the larvae caught at this time were postlarvae.

Significantly greater numbers of shiners and clupeids were found in the surface samples than in the bottom samples. This trend was evident over all runs and transects when the fish were captured and was most dramatic when the larvae were most abundant. Many of these larvae were prolarvae in addition to postlarvae.

No significant differences in distribution were found for white bass or freshwater drum. The other species were not tested because of the generally low numbers of larvae sampled.

REFERENCES

1. Great Lakes Basin Commission, 1975. Appendix 10, Power, Great Lakes Basin Framework Study. Great Lakes Basin Commission, Ann Arbor, Mich. 169 p.

2. Cole, R. A. 1976. The impact of thermal discharge from the Monroe Power Plant and the aquatic community in Western Lake Erie. Michigan State Univ. Inst. Water Res., Tech. Rep. No. 326.

3. Hartman, W. L. 1972. Lake Erie: Effects of exploitation, environmental changes and new species on the fishery resources. J. Fish. Res. Board Can. 29(6):899-912.

4. Regier, H. A., and W. L. Hartman. 1973. Lake Erie fish community: 150 years of cultural stress. Science 180:1248-1255.

5. Nelson, D. D. and R. A. Cole. 1975. The distribution and abundance of larval fishes along the western shore of Lake Erie at Monroe, Michigan. Michigan State Univ., Inst. Water Res., Tech. Rep. 32.4. 66 p.

6. Scott, W. B. and E. J. Crossman. 1973. Freshwater Fishes of Canada. Bulletin 184. Fish. Res. Board Can. Bull. 184. 966 p.

7. Mansueti, A. J. 1964. Early development of the yellow perch Perca flavescens. Chesapeake Sci. 5:46-66.

8. Mansueti, A. J. and J. D. Hardy, Jr. 1967. Development of fishes of the Chesapeake Bay region. An atlas of egg, larval and juvenile stages. Part 1. Nat. Res. Inst. Univ., Maryland. 202 p.

9. Fish, M. P. 1932. "Contributions to the early life histories of sixty-two species of fishes from Lake Erie and its tributary waters. Bull. U.S. Bur. Fish. 10, Vol. 47:293-298. 1932.

10. Rupp, R. S. 1965. Shore spawning and survival of eggs of the American smelt. Trans. Am. Fish. Soc. 94:160-169.

Appendix A LARVAL FISH TAXA COLLECTED IN LAKE ERIE IN 1975 AND 1976

	Species Name	Year Captured
1	Aplodinotus grunniens, Freshwater Drum	1975, 1976
2	Catostomidae, Suckers	1975, 1976
3	Cluepidae, Clupeids (Gizzard Shad and Alewife, Alosa pseudoharengus; Dorosoma cepedianum)	1975, 1976
4	Cyprinus carpio, Carp	1975
5	Esox lucius, Northern Pike	1975, 1976
6	Etheostoma sp., Darters	1975
7	Etheostoma nigrum, Johnny Darter	1976
8	Fundulus diaphanus, Banded Killifish	1975
9	Ictalurus punctatus, Channel Catfish	1975, 1976
10	Labidesthes sicculus, Brook Silversides	1975, 1976
11	Lepomis sp., Sunfishes unknown sp.	1975
12	Lepomis macrochirus, Bluegill	1975
13	Micropterus sp., Bass	1975, 1976
14	Morone chrysops, White Bass	1975, 1976
15	Notropis sp., Shiner unknown sp.	1975, 1976
16	Notropis atherinoides, Emerald Shiner	1975, 1976
17	Notropis hudsonius, Spottail Shiner	1975, 1976
18	Osmerus mordax, Rainbow Smelt	1975, 1976
19	Perca flavescens, Yellow Perch	1975, 1976
20	Percina caprodes, Logperch	1975, 1976
21	Pomoxis sp., Crappie unknown sp.	1975, 1976
22	Stizostedion vitreum, Walleye	1976
23	Species A	1976
24	Species B	1976
25	Species C	1976
26	Species D	1975, 1976
27	Unknown species	

Appendix B

Table B-1. Densities (Numbers/100 m^3) of Yellow Perch at Each Station, by Contour, 1975. (S and B* - Averages Exclude Beach Stations 18-20)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	0.64		00		0		0		0		0					
	19	0		00		0		0		0		0					
	20	46.35		3.90		0		0		0		-					
	S & B Avg.	-		-		-		-		-		0 ± 0					
	Cell Avg.	15.66 ± 26.58		1.30 ± 2.25		0 ± 0		0 ± 0		0 ± 0							
6-12	1	0.42	0	7.13	6.20	0	0.33	3.00	0.33	0	0	0	0				
	4	0	0.53	0	0.35	0	0	0.36	0.32	0	0	0	0				
	7	0.42	0	0	0	0	0	0	0	0	0	0	0.35				
	11	NS	NS	6.06	5.01	0	0	0	0	0	0	0	0				
	14	NS	NS	4.98	1.57	0	0	0	0	0	0	0	0				
	17	NS	NS	1.00	11.45	0	0	0	0	0	0.35	0	0				
	S & B Avg.	0.28	0.18	3.19	4.10	0	0.06	0.56	0.11	0	0.06	0	0.12				
	Cell Avg.	0.23 ± 0.25		3.64 ± 3.71		0.03 ± 0.10		0.33 ± 0.85		0.03 ± 0.10		0.03 ± 0.10					
12-18	5	0.82	0.37	0	1.04	0	0	0	0	0	0	0	0				
	8	0	0	0	0	0	0	0	0	0	0	0	0				
	12	NS	NS	1.11	0	0	0	0	0	0	0	0	0				
	15	NS	NS	5.99	2.10	0	0	0	0	0	0	0	0				
	S & B Avg.	0.41	0.18	1.78	0.78	0	0	0	0	0	0	0	0				
	Cell Avg.	0.30 ± 0.39		1.28 ± 2.05		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
18-24	2	0	0	0	0.64	0	0	0	0	0	0	0	0.33				
	9	0.40	0.57	0	0	0	0	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0	0	0	0	0	0	0				
	16	NS	NS	0	0.72	0	0	0	0	0	0	0	0.11				
	S & B Avg.	0.20	0.29	0	0.34	0	0	0	0	0	0	0	0.11				
	Cell Avg.	0.24 ± 0.29		0.17 ± 0.32		0 ± 0		0 ± 0		0 ± 0		0.04 ± 0.12					
24-30	3	0	0	0	1.02	0	0	0	0	0	0.32	0	NS				
	6	0	0	0	0.31	0	0	0.35	1.22	0	0	0	0				
	10	NS	NS	0.36	1.72	0	0	0	0	0	0	0.38	0				
	S & B Avg.	0	0	0.12	1.02	0	0	0.12	0.41	0	0.11	0.13	0				
	Cell Avg.	0 ± 0		0.57 ± 0.68		0 ± 0		0.26 ± 0.49		0.05 ± 0.13		0.08 ± 0.17					
Run Avgs.	S & B Avg.	0.23	0.16	1.57	1.89	0	0.02	0.22	0.11	0	0.04	0.02	0.04				
	Overall	2.30 ± 9.84		1.69 ± 2.73		0.01 ± 0.06		0.15 ± 0.53		0.02 ± 0.08		0.03 ± 0.10					

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-2. Densities (Numbers/100 m^3) of Yellow Perch at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18		0		0		0		47.68		0		0.64		0		0				
	19		0		0.91		1.82		1.82		1.37		0		0		0				
	20		0		0		NS		1.95		4.39		0.49		0		0				
	S & B Avgs.		-		-		-		-		-		-		-		-				
	Cell Avg.		0 ± 0		0.30 ± 0.53		0.61 ± 1.05		17.15 ± 26.44		1.92 ± 2.25		1.15 ± 1.67		0 ± 0		0 ± 0				
6-12	1	NS	NS	0	1.18	1.84	0	0.61	1.78	0	0.80	NS	NS	0.58	0	0.52	0.97				
	4	NS	NS	0.88	1.18	0	0	0	1.96	0	0	NS	NS	0	0.39	0.33	0				
	7	NS	NS	1.32	2.74	NS	NS	3.44	1.60	0	0	NS	NS	0	0.44	0	0				
	11	NS	NS	1.53	9.00	NS	NS	0.88	1.57	0.50	0.46	NS	NS	0	0	0	0				
	14	NS	NS	0.33	9.88	NS	NS	5.24	1.12	0	0	NS	NS	0	0	0	0				
	17	NS	NS	0.91	9.59	NS	NS	1.32	0	0	0.44	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.83	5.60	0.92	0	1.91	1.34	0.08	0.28	NS	NS	0.10	0.14	0.14	0.16				
	Cell Avg.	-	-	3.21 ± 3.85		0.46 ± 0.92		1.62 ± 1.47		0.18 ± 0.28		-	-	0.12 ± 0.22		0.15 ± 0.31					
12-18	5	NS	NS	0	0	NS	NS	NS	NS	0	0.39	NS	NS	0	0.35	0	0				
	8	NS	NS	0.44	0.39	NS	NS	0	0.78	0	0	NS	NS	0	0.52	0	0				
	12	NS	NS	0	0.41	NS	NS	0.44	0.39	0	0.36	NS	NS	0	0	0.37	0				
	15	NS	NS	1.78	8.68	NS	NS	0.88	0.34	0	0	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.56	2.37	NS	NS	0.44	0.51	0	0.19	NS	NS	0	0.22	0.09	0				
	Cell Avg.	-	-	1.46 ± 2.97		-	-	0.47 ± 0.32		0.09 ± 0.17		-	-	0.11 ± 0.20		0.05 ± 0.13					
18-24	2	NS	NS	0	0	3.62	11.81	6.59	8.56	0	0.78	NS	NS	0	0.73	0	1.86				
	9	NS	NS	0	0	NS	NS	0	1.96	0	0.86	NS	NS	0	0	0	0				
	13	NS	NS	0	0	NS	NS	0.44	0.78	0.48	1.08	NS	NS	0	0	0	1.76				
	16	NS	NS	0.96	0	NS	NS	0	0	0	0	NS	NS	0	1.09	0.39	0				
	S & B Avgs.	NS	NS	0.24	0	3.62	11.81	1.76	2.83	0.12	0.68	NS	NS	0	0.46	0.10	0.90				
	Cell Avg.	-	-	0.12 ± 0.34		7.71 ± 5.80		2.29 ± 3.37		0.40 ± 0.46		-	-	0.23 ± 0.43		0.50 ± 0.82					
24-30	3	NS	NS	0	0	11.12	11.54	0.88	0	0.24	0	NS	NS	0.58	0.91	0	1.74				
	6	NS	NS	NS	0	NS	NS	12.30	12.54	0	0	NS	NS	0.58	0.41	0	1.70				
	10	NS	NS	0	0	NS	NS	0	0	4.45	1.36	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0	0	11.12	11.54	4.39	4.18	1.56	0.45	NS	NS	0.37	0.44	0	1.14				
	Cell Avg.	-	-	0 ± 0		11.33 ± 0.29		4.29 ± 6.31		1.01 ± 1.77		-	-	0.41 ± 0.36		0.57 ± 0.89					
Run Avgs.	S & B Avgs.	NS	NS	0.51	2.53	4.14	5.84	2.06	2.59	0.33	0.38	NS	NS	0.10	0.28	0.10	0.47				
	Overall	0 ± 0		1.45 ± 2.89		4.18 ± 5.18		3.37 ± 8.35		0.48 ± 1.03		0.37 ± 0.33		0.18 ± 0.30		0.26 ± 0.57					

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-3. Densities (Numbers/100 m³) of Clupeids at Each Station by Contour, 1975. (S & B* Averages Exclude Beach Stations 18-20).

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18		56.55		2643.28		81.33		31.15		0		10.17		0		NS
	19		2.28		675.77		112.48		9.56		4.55		6.33		0		NS
	20		349.34		1139.74		401.05		0		0		7.81		0		0
	S & B Avg.																
	Cell Avg.	[illegible]	± 186.69	1486.26	± 1028.51	198.29	± 176.29	13.57	± 15.06	1.52	± 2.63	8.27	± 1.72	0	± 0	0	± 0
6-12	[illegible]	[illegible]	64.60	874.87	1167.36	0.99	1.00	67.27	85.60	1.76	1.83	0.72	0.98	NS	NS	5.75	11.98
	[illegible]	[illegible]	61.84	20.98	33.18	5.72	27.42	49.95	12.90	1.09	0.34	0.39	0	NS	NS	12.79	4.02
	[illegible]	[illegible]	23.39	0.33	5.09	46.72	61.50	4.13	0.65	0	0.34	0	0	NS	NS	0.39	0
	[illegible]	[illegible]	NS	14.77	5.73	158.30	126.68	3.20	1.44	0.75	1.80	0	0	NS	NS	0	0
	[illegible]	[illegible]	NS	1273.06	974.92	1273.44	1529.69	9.76	7.55	14.13	3.38	21.26	5.78	NS	NS	0	0
	[illegible]	[illegible]	NS	1916.72	103.08	931.07	1157.60	43.46	23.57	2.57	0.35	0.36	0	NS	NS	1.54	0
	[illegible]	[illegible]	51.58	[illegible]3.46	381.56	402.71	483.98	29.63	21.95	3.38	1.27	3.79	1.13	NS	NS	3.84	2.32
	[illegible]	[illegible]	[illegible]	[illegible],51	± 673.04	443.34	± 592.20	25.79	± 28.86	2.33	± 3.85	2.46	± 6.14	-	-	3.13	± 4.81
12-18	[illegible]	[illegible]	1.48	0.33	2.78	116.12	68.71	68.36	12.04	2.45	0.66	1.97	0	NS	NS	0	0
	[illegible]	[illegible]	24.26	2.49	3.12	44.45	27.02	1.13	0.66	0	0	0	0	NS	NS	1.16	0
	[illegible]	[illegible]	NS	19.59	298.09	15.86	55.70	9.38	1.24	0.81	0	0	0	NS	NS	0	0
	[illegible]	[illegible]	NS	558.49	74.13	136.73	87.31	4.01	5.65	0.37	0	0	0	NS	NS	0	0
	S & B Avg.	[illegible]	12.87	145.22	94.53	78.29	59.06	20.87	4.90	0.91	0.16	0.49	0	NS	NS	0.29	0
	Cell Avg.	[illegible]	± 68.84	119.88	± 204.14	69.12	± 42.14	12.88	± 22.81	0.54	± 0.84	0.25	± 0.70	-	-	0.14	± 0.41
18-24	2	0	0.38	133.12	218.69	38.02	24.22	7.18	10.30	1.79	4.27	1.82	0.66	NS	NS	1.25	0
	[illegible]	[illegible]	69.47	7.55	0	81.96	41.26	12.64	2.66	24.94	0	0	0	NS	NS	0	0
	13	NS	NS	2.34	9.02	14.99	114.82	4.34	3.58	0	0	0	0	NS	NS	0.41	0
	[illegible]	NS	NS	0	1.44	1.06	4.89	4.78	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	[illegible].34	34.92	35.75	57.29	34.00	46.30	7.24	4.14	6.68	1.07	0.45	0.17	NS	NS	0.41	0
	Cell Avg.	67.13	± 93.59	46.52	± 83.13	40.15	± 39.62	5.69	± 4.15	3.87	± 8.64	0.31	± 0.65	-	-	0.21	± 0.44
24-30	3	0.76	1.86	32.17	132.63	1.96	5.26	86.61	3.04	7.55	0.32	0.67	NS	NS	NS	0	0
	6	0	10.20	42.07	57.12	6.84	36.61	6.99	6.12	3.04	3.15	18.70	1.14	NS	NS	0	0
	10	NS	NS	27.53	6.89	40.52	52.91	11.53	4.28	0.76	0	19.32	1.20	NS	NS	0	0
	S & B Ave.	0.38	6.02	33.92	65.55	16.44	31.59	35.05	4.48	4.08	1.16	12.89	1.17	NS	NS	0	0
	Cell Avg.	3.20	± 4.72	49.74	± 43.87	24.02	± 21.91	19.76	± 32.88	2.62	± 2.89	8.20	± 9.87	-	-	0	± 0
Run Avg.	S & B Avg.	63.53	29.15	289.79	181.96	171.46	201.39	23.26	10.66	3.70	0.94	3.84	0.61	NS	NS	1.38	1.70
	Overall	59.16	± 84.48	337.26	± 610.48	187.39	± 379.24	16.58	± 24.15	2.26	± 4.70	2.77	± 5.74	0	± 0	1.15	± 3.11

* S = Surface; B = Bottom; NS = No Sample

Reproduced from best available copy.

Appendix B

Table B-4. Densities (Numbers/100 m^3) of Clupeids at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run:	1		2		3		4		5		6		7		8		9		10	
			S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B
0-6	18			0		0		0		0		0		14567.70		120.79		0		17.80		3.81
	19			0		0		0		0		27.33		3.19		5.47		0		2.73		34.62
	20			0		0		NS		0		18.04		1.95		1.95		0		0.49		5.85
	S & B Avgs.			-		-		-		-		-		-		-		-		-		-
	Cell Avg.			0 ± 0		0 ± 0		0 ± 0		0 ± 0		15.12 ± 13.90		4857.6 ± 8409.6		42.74 ± 67.62		0 ± 0		7.01 ± 9.41		14.76 ± 17.22
6-12	1		NS	NS	0	0	0	0	0	0	0.37	5.58	NS	NS	32.63	9.74	6.72	6.29	NS	NS	NS	NS
	4		NS	NS	0	0	0	0	2.20	0	898.14	687.50	NS	NS	6.59	8.62	2.00	0	NS	NS	7.58	1.23
	7		NS	NS	0	0.39	NS	NS	0	0	53.03	36.07	NS	NS	0	0.44	0	0	NS	NS	1.34	0.54
	11		NS	NS	0	0.43	NS	NS	5.71	4.70	71.21	111.93	NS	NS	2.27	0.39	0.88	0	NS	NS	1.16	0
	14		NS	NS	1.65	0	NS	NS	13.47	26.56	376.04	233.35	NS	NS	16.41	4.31	0	0	NS	NS	0.37	0.43
	17		NS	NS	0	0	NS	NS	76.86	92.08	1527.74	1283.22	NS	NS	0.58	0.78	0.72	4.22	NS	NS	0	6.99
	S & B Avgs.		NS	NS	0.27	0.14	0	0	16.37	20.56	487.76	226.27	NS	NS	9.75	4.05	1.72	1.75	NS	NS	2.09	1.84
	Cell Avg.		-	-	0.21 ± 0.48		0 ± 0		18.46 ± 31.97		357.01 ± 465.30		-	-	6.90 ± 9.54		1.74 ± 2.55		-	-	1.96 ± 2.85	
12-18	5		NS	NS	0	0	NS	NS	NS	NS	99.73	44.28	NS	NS	2.15	4.19	2.02	0	NS	NS	0.85	NS
	8		NS	NS	0.44	0	NS	NS	0.44	0	78.92	15.15	NS	NS	1.55	5.16	2.31	0	NS	NS	3.72	0.43
	12		NS	NS	0	0	NS	NS	1.32	0.39	102.27	10.02	NS	NS	1.87	1.07	0.74	0.73	NS	NS	1.09	0
	15		NS	NS	0.45	0	NS	NS	6.15	37.88	586.94	5.79	NS	NS	3.83	0	1.72	2.96	NS	NS	0	0
	S & B Avgs.		NS	NS	0.22	0	NS	NS	2.64	12.76	216.96	18.81	NS	NS	2.35	2.61	1.71	0.92	NS	NS	1.42	0.14
	Cell Avg.		-	-	0.11 ± 0.20		-	-	7.70 ± 14.96		117.89 ± 193.56		-	-	2.48 ± 1.75		1.32 ± 1.11		-	-	0.87 ± 1.33	
18-24	2		NS	NS	0	0	0	0	0	0	36.01	1.18	NS	NS	42.82	75.64	4.85	64.32	NS	NS	NS	NS
	9		NS	NS	0	0	NS	NS	0.88	3.53	10.64	3.43	NS	NS	1.96	0	1.67	0	NS	NS	2.57	0.65
	13		NS	NS	0	0	NS	NS	0.88	0	12.44	7.19	NS	NS	9.34	1.96	71.18	10.57	NS	NS	0.33	0
	16		NS	NS	0	0	NS	NS	0	0	559.83	14.57	NS	NS	57.10	47.27	1.17	1.01	NS	NS	0.37	0
	S & B Avgs.		NS	NS	0	0	0	0	0.44	0.88	154.73	6.59	NS	NS	27.80	31.22	19.72	18.98	NS	NS	1.09	0.22
	Cell Avg.		-	-	0 ± 0		0 ± 0		0.66 ± 1.22		80.66 ± 193.91		-	-	29.51 ± 29.71		19.35 ± 30.12		-	-	0.65 ± 0.97	
24-30	3		NS	NS	0	0	0	0	0	0	29.83	56.86	NS	NS	69.52	43.64	484.62	55.01	NS	NS	NS	NS
	6		NS	NS	NS	0	NS	NS	0	0	0.96	1.55	NS	NS	154.43	146.10	9.61	0	NS	NS	NS	NS
	10		NS	NS	0	0	NS	NS	0	0	7.68	2.73	NS	NS	0.44	0.44	4.89	0.36	NS	NS	0.57	0
	S & B Avgs.		NS	NS	0	0	0	0	0	0	12.82	20.38	NS	NS	74.80	63.39	166.37	18.46	NS	NS	0.57	0
	Cell Avg.		-	-	0 ± 0		0 ± 0		0 ± 0		16.60 ± 22.54		-	-	69.09 ± 68.25		92.42 ± 193.26		-	-	0.28 ± 0.40	
Run Avgs.	S & B Avgs.		NS	NS	0.16	0.05	0	0	6.74	10.32	261.87	89.44	NS	NS	23.73	20.57	35.01	8.56	NS	NS	1.53	0.86
	Overall		0 ± 0		0.09 ± 0.30		0 ± 0		7.77 ± 20.76		162.64 ± 317.39		4857.6 ± 8409.2		23.83 ± 40.94		20.02 ± 80.39		7.01 ± 9.41		2.66 ± 6.62	

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-5. Densities (Numbers/100 m^3) of Shiners at each Station by Contour, 1975. (S & B - Averages Exclude Beach Stations 18-20)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	4.45		0		17.16		3.18		3.91		9.53		0		NS	
	19	6.83		1.82		2.73		1.37		27.78		1.37		0		NS	
	20	0.49		3.90		41.96		1.46		21.47		0		0		0	
	S & B Avg.	-		-		-		-		-		-		-		-	
	Cell Avg.	3.92 ± 3.20		1.91 ± 1.95		20.62 ± 19.84		2.00 ± 1.02		17.67 ± 12.42		3.63 ± 5.15		0 ± 0		0 ± 0	
6-12	1	4.19	2.42	3.56	0	0	0	20.98	1.33	0	0	0	0	NS	NS	0	1.24
	4	4.50	1.59	0.35	0	0.67	0	61.80	1.93	0	0	0	0	NS	NS	0	2.27
	7	0	0.72	0	0	2.54	0	1.13	0.65	1.94	0.69	0	1.39	NS	NS	0	0.34
	11	NS	NS	2.27	0	22.57	15.10	1.06	0	3.38	6.32	0	0.64	NS	NS	0.40	0
	14	NS	NS	1.99	6.66	57.27	16.10	0.34	0	0	0	0	0.38	NS	NS	1.54	0
	17	NS	NS	0.33	0	241.76	16.36	3.98	0	0	0	0.36	0	NS	NS	0	0.34
	S & B Avg.	2.90	1.58	1.42	1.11	54.13	7.93	14.88	0.65	0.89	1.17	0.06	0.40	NS	NS	0.32	0.70
	Cell Avg.	2.27 ± 1.83		1.26 ± 2.07		31.03 ± 68.39		7.77 ± 17.99		1.03 ± 1.98		0.25 ± 0.44		-		0.51 ± 0.76	
12-18	5	1.23	0	0.33	0.35	1.33	2.13	27.27	0	0.70	0.33	0	0	NS	NS	0	0
	8	0	0	0	0.35	23.06	1.07	0	0	0	0	0.39	0	NS	NS	0	0
	12	NS	NS	3.70	0.33	27.84	5.22	14.78	4.34	0.81	0	0.76	0	NS	NS	0	0
	15	NS	NS	33.83	0.35	14.18	3.27	4.68	0	0.37	0	0.41	0	NS	NS	5.39	0.32
	S & B Avg.	0.61	0	9.46	0.34	16.60	2.22	11.68	1.09	0.47	0.08	0.39	0	NS	NS	1.35	0.08
	Cell Avg.	0.31 ± 0.61		4.90 ± 11.75		9.76 ± 10.63		6.38 ± 9.83		0.28 ± 0.33		0.19 ± 0.29		-		0.71 ± 1.89	
18-24	2	0	0	0.36	0.64	0.33	0	2.73	2.12	1.07	0	0.36	0	NS	NS	0	0
	9	0.40	0	4.31	0.65	40.44	1.30	4.78	0	0	0	0	0	NS	NS	0	0
	13	NS	NS	13.04	118.71	11.80	5.39	3.34	0	12.45	0	0.41	0	NS	NS	0	0
	16	NS	NS	3.55	1.44	1.06	0	2.05	0.85	0.77	0	0.77	0	NS	NS	0	0
	S & B Avg.	0.20	0	5.32	30.36	13.41	1.67	3.23	0.74	3.57	0	0.38	0	NS	NS	0	0
	Cell Avg.	0.10 ± 0.20		17.84 ± 40.97		7.54 ± 13.00		1.98 ± 1.67		1.79 ± 4.33		0.19 ± 0.29		-		0 ± 0	
24-30	3	4.92	0.46	5.59	1.70	0.33	0	24.34	1.01	2.16	0	0	NS	NS	NS	0	0
	6	0.78	0.42	1.50	0	43.06	3.41	12.59	0	0.71	0	0	0	NS	NS	0	0
	10	NS	NS	5.80	0.69	5.28	0	83.11	1.22	0	0	0	0	NS	NS	0	0
	S & B Avg.	2.85	0.44	4.30	0.80	16.22	1.14	40.01	0.75	0.96	0	0	0	NS	NS	0	0
	Cell Avg.	1.65 ± 2.19		2.55 ± 2.51		8.68 ± 16.98		20.38 ± 32.15		0.48 ± 0.87		0 ± 0		-		0 ± 0	
Run Avgs.	S & B Avg.	1.78	0.62	4.74	7.76	29.03	4.08	15.82	0.79	1.43	0.43	0.20	0.15	NS	NS	0.43	0.26
	Overall	1.59 ± 2.09		5.89 ± 19.95		16.88 ± 40.74		7.80 ± 17.29		2.29 ± 5.94		0.48 ± 1.60		0 ± 0		0.39 ± 1.01	

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-6. Densities (Numbers/100 m³) of Shiners at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18							1.91		0		10.81		1.27		0.64		3.81			
	19							0.46		2.73		0.91		0		2.28		12.75			
	20							0		1.46		2.44		0.49		0.49		0			
	S & B Avgs.							-		-		-		-		-		-			
	Cell Avg.							0.79 ± 1.00		1.40 ± 1.37		4.72 ± 5.33		0.59 ± 0.64		1.13 ± 0.99		5.52 ± 6.55			
6-12	1							0	0	0	0	NS	NS	1.17	0.72	3.10	0	NS	NS		
	4							2.20	0.78	4.38	0	NS	NS	0.44	0	0	0	NS	NS		
	7							0	0	0	0	NS	NS	0	0	1.54	0	NS	NS		
	11							0.44	0	0	0	NS	NS	0	0	8.78	2.42	NS	NS		
	14							0.37	0	0	0.42	NS	NS	2.52	0	10.33	1.30	NS	NS		
	17							0	0	31.24	0.87	NS	NS	0	0	3.58	2.81	NS	NS		
	S & B Avgs.							0.50	0.13	5.94	0.22	NS	NS	0.69	0.12	4.56	1.09	NS	NS		
	Cell Avg.							0.32 ± 0.64		3.08 ± 8.96		-	-	0.40 ± 0.77		2.82 ± 3.42		-	-		
12-18	5							NS	NS	1.37	1.96	NS	NS	23.13	0.35	0	0.38	NS	NS		
	8							0.19	0	0	0	NS	NS	0	0	1.16	0	NS	NS		
	12							0	0	3.25	0	NS	NS	1.24	0	0	0	NS	NS		
	15							0.44	0	14.20	0.89	NS	NS	0	0	14.15	2.96	NS	NS		
	S & B Avgs.							0.21	0	4.70	0.71	NS	NS	6.09	0.09	3.83	0.84	NS	NS		
	Cell Avg.							0.10 ± 0.18		2.71 ± 4.78		-	-	3.09 ± 8.11		2.33 ± 4.88		-	-		
18-24	2							0	0	0.88	0	NS	NS	21.08	0.73	16.97	2.78	NS	NS		
	9							0	0.78	0.48	0.86	NS	NS	1.47	1.29	0	0	NS	NS		
	13							0	0	5.74	0	NS	NS	1.24	0.39	9.86	0.35	NS	NS		
	16							0.44	0	11.60	0	NS	NS	2.22	0.36	55.17	0.39	NS	NS		
	S & B Avgs.							0.11	0.20	4.68	0.21	NS	NS	6.50	0.69	20.50	0.88	NS	NS		
	Cell Avg.							0.15 ± 0.30		2.44 ± 4.17		-	-	3.60 ± 7.09		10.69 ± 18.99		-	-		
24-30	3							0	0	0.95	0.68	NS	NS	4.81	0	23.58	0.58	NS	NS		
	6							0	0	3.82	1.16	NS	NS	31.47	13.39	4.80	1.02	NS	NS		
	10							0	0	2.02	0	NS	NS	0	0	4.40	0.36	NS	NS		
	S & B Avgs.							0	0	2.26	0.62	NS	NS	12.09	4.46	10.93	0.65	NS	NS		
	Cell Avg.							0 ± 0		1.44 ± 1.34		-	-	8.28 ± 12.50		5.79 ± 8.93		-	-		
Run Avgs.	S & B Avgs.							0.26	0.10	4.70	0.40	NS	NS	5.34	1.01	9.26	0.90	NS	NS		
	Overall							0.23 ± 0.51		2.46 ± 5.75		4.72 ± 5.33		2.97 ± 7.21		4.76 ± 10.05		5.52 ± 6.55			

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-7. Densities (Numbers/100 m^3) of Freshwater Drum at Each Station, By Contour, 1975. (S & B* Averages Exclude Beach Stations 18-20)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	0		10.17		0		0		0		0					
	19	0		0		0		0		0		0					
	20	15.61		0		1.95		0		0		0					
	S & B Avg.	-		-		-		-		-		-					
	Cell Avg.	5.20 ± 9.01		3.39 ± 5.87		0.65 ± 1.13		0 ± 0		0 ± 0		0 ± 0					
6-12	1	0	0.20	0	0	0	0	0	0	0	0	0	0				
	4	0	0	0	0.35	0	0	0	0	0	0	0	0				
	7	0	0	0	0	0	0	0	0	0	0	0	0				
	11	NS	NS	3.03	2.15	0	0	0	0	0	0	0	0.38				
	14	NS	NS	0	182.21	0	2.68	0	0	0	0	0	0				
	17	NS	NS	504.64	143.16	0.67	0	0	0	0	0	0	0.06				
	S & B Avg.	0	0.07	84.61	54.64	0.11	0.45	0	0	0	0	0	0.03				
	Cell Avg.	0.03 ± 0.08		69.63 ± 150.82		0.28 ± 0.78		0 ± 0		0 ± 0		0.03 ± 0.11					
12-18	5	0	0	0	0	0	0.61	0	0	0	0	0	0				
	8	0.38	0.61	0	0.35	0	0.36	0	0	0	0	0	0				
	12	NS	NS	0.37	1.32	0.35	2.46	0	0	0	0	0	0				
	15	NS	NS	4.58	0.70	0.73	0.98	0	0	0	0	0	0				
	S & B Avg.	0.19	0.31	1.24	0.59	0.27	1.10	0	0	0	0	0	0				
	Cell Avg.	0.25 ± 0.30		0.91 ± 1.55		0.68 ± 0.79		0 ± 0		0 ± 0		0 ± 0					
18-24	2	0	0	0	0.32	0	0	0	0	0	0	0	0				
	9	0	0	0	0	0	0	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0.34	0	0	0	0	0	0				
	16	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	0	0	0	0.08	0	0.08	0	0	0	0	0	0				
	Cell Avg.	0 ± 0		0.04 ± 0.11		0.04 ± 0.12		0 ± 0		0 ± 0		0 ± 0					
24-30	3	0	0	0	0	0	0	0	0	0	0	0	NS				
	6	0	0	0	0	0	0	0	0	0	0	0	0				
	10	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	0	0	0	0	0	0	0	0	0	0	0	0				
	Cell Avg.	0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
Run Avgs.	S & B Avg.	0.04	0.09	30.15	19.44	0.10	0.44	0	0	0	0	0	0.02				
	Overall	0.80 ± 3.40		23.06 ± 89.57		0.30 ± 0.67		0 ± 0		0 ± 0		0.01 ± 0.06					

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-8. Densities (Numbers/100 m^3) of Freshwater Drum at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18									0		0		0		0					
	19									0		0		0		0					
	20									0		0		0		0					
	S & B Avgs.									-		-		-		-					
	Cell Avg.									0 ± 0		0 ± 0		0 ± 0		0 ± 0					
6-12	1																				
	4									0	0	NS	NS	0	0	0	3.38				
	7									0	0	NS	NS	0	0	0	0				
	11									0	0	NS	NS	0	0	0	0				
	14									0	5.97	NS	NS	0	0	0	0				
	17									3.90	27.23	NS	NS	0	0	0	0				
	S & B Avgs.									11.66	11.80	NS	NS	0	0.39	0	0				
	Cell Avg.									2.59	7.50	NS	NS	0	0.06	0	0.56				
										5.05 ± 8.32		-	-	0.03 ± 0.11		0.28 ± 0.98					
12-18	5																				
	8									0	0.39	NS	NS	0	0	0	0				
	12									0	0	NS	NS	0	0.52	0	0				
	15									0	0	NS	NS	0	0.54	0	0				
	S & B Avgs.									1.70	6.24	NS	NS	0	0	0	0				
	Cell Avg.									0.43	1.66	NS	NS	0	0.26	0	0				
										1.04 ± 2.18		-	-	0.13 ± 0.24		0 ± 0					
18-24	2																				
	9									0	0	NS	NS	0	0	0	0				
	13									0	0	NS	NS	0	1.72	0	1.26				
	16									0	0	NS	NS	0	0.39	0	0				
	S & B Avgs.									1.86	5.55	NS	NS	0	0.36	0	0				
	Cell Avg.									0.46	1.39	NS	NS	0	0.62	0	0.32				
										0.93 ± 1.98		-	-	0.31 ± 0.58		0.16 ± 0.45					
24-30	3																				
	6									0	0	NS	NS	0	0	0	0.29				
	10									0	0	NS	NS	0	0	0	0				
	S & B Avgs.									0	0	NS	NS	0	1.31	0.49	0				
	Cell Avg.									0	0	NS	NS	0	0.44	0.16	0.10				
										0 ± 0		-	-	0.22 ± 0.54		0.13 ± 0.21					
Run Avgs.	S & B Avgs.									1.12	3.36	NS	NS	0	0.31	0.03	0.29				
	Overall									2.06 ± 5.23		0 ± 0		0.14 ± 0.37		0.15 ± 0.59					

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-9. Densities (Numbers/100 m^3) of Carp at Each Station, by Contour, 1975. (*S & B Averages Exclude Beach Stations 18-20).

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	1.27		10.17		1.91		0.64		0		0					
	19	0		0		0		0		0		0					
	20	1.46		0		0		0		0		0					
	S & B Avg.	-		-		-		-		-		-					
	Cell Avg.	0.91 ± 0.80		3.39 ± 5.37		0.64 ± 1.10		0.21 ± 0.37		0 ± 0		0 ± 0					
6-12	1	1.05	0	0	2.07	29.64	0	1.00	1.00	0	0	0.72	0.98				
	4	4.50	4.23	0	0.35	0	0	0	0	0	0.34	0	0				
	7	0	0	0	0	0	0	0.38	0	0	0	0	0				
	11	NS	NS	0.38	0	0	0	0	0	0	0	0	0				
	14	NS	NS	0	0	0.72	0	0	0	0.38	0	0	0				
	17	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	1.85	1.41	0.06	0.40	5.06	0	0.23	0.17	0.06	0.06	0.12	0.16				
	Cell Avg.	1.63 ± 2.16		0.23 ± 0.59		2.53 ± 8.54		0.20 ± 0.39		0.06 ± 0.14		0.14 ± 0.34					
12-18	5	0	0	0.65	0.69	0	0	0	0	0	0	0	0				
	8	0	0.31	0	0	0.33	0	0	0	0	0	0	0				
	12	NS	NS	0	0	0	0	0	0	0	0	0	0				
	15	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	0	0.15	0.16	0.17	0.08	0	0	0	0	0	0	0				
	Cell Avg.	0.08 ± 0.15		0.17 ± 0.31		0.04 ± 0.12		0 ± 0		0 ± 0		0 ± 0					
18-24	2	4.17	0	0	0	0	0	0	0	0	0	0	0				
	9	0	0	0	0	0.36	0	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0	0	0	0	0	0	0				
	16	NS	NS	0	0	0	0	0.68	0	0	0	0	0				
	S & B Avg.	2.08	0	0	0	0.09	0	0.17	0	0	0	0	0				
	Cell Avg.	1.04 ± 2.08		0 ± 0		0.04 ± 0.13		0.09 ± 0.24		0 ± 0		0 ± 0					
24-30	3	0	0	0	0	0	0	0	0	0	0	0	NS				
	6	0	0	0	0	0	0	0.35	0	0	0	0	0				
	10	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	0	0	0	0	0	0	0.12	0	0	0	0	0				
	Cell Avg.	0 ± 0		0 ± 0		0 ± 0		0.06 ± 0.14		0 ± 0		0 ± 0					
Run Avg.	S & B Avg.	1.08	0.50	0.06	0.18	1.83	0	0.14	0.06	0.02	0.02	0.04	0.06				
	Overall	0.81 ± 1.53		0.39 ± 1.69		0.89 ± 4.87		0.11 ± 0.27		0.02 ± 0.08		0.05 ± 0.20					

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-10. Densities (Numbers/100 m^3) of Carp at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18								0.64		0		0		0		0		0.64		
	19								0		0.46		0		0		0		0		
	20								0		0		0.98		0		0		0		
	S & B Avgs.								-		-		-		-		-		-		
	Cell Avg.								0.21 ± 0.37		0.15 ± 0.26		0.32 ± 0.56		0 ± 0		0 ± 0		0.21 ± 0.37		
6-12	1							0	0	0	0	NS	NS	1.75	1.80	0	2.42	NS	NS		
	4							0.88	0	0	0	NS	NS	17.13	1.96	0	0	NS	NS		
	7							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	11							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	14							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	17							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0.15	0	0	0	NS	NS	3.15	0.63	0	0.40	NS	NS		
	Cell Avg.							0.07 ± 0.25		0 ± 0		-	-	1.89 ± 4.87		0.20 ± 0.70		-	-		
12-18	5							NS	NS	0	0	NS	NS	0	0.70	0.41	0	NS	NS		
	8							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	12							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	15							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0	0	NS	NS	0	0.18	0.10	0	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		-	-	0.09 ± 0.25		0.05 ± 0.15		-	-		
18-24	2							0	0	0	0	NS	NS	0	0.37	0	0.31	NS	NS		
	9							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	13							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	16							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0	0	NS	NS	0	0.09	0	0.08	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		-	-	0.05 ± 0.13		0.04 ± 0.11		-	-		
24-30	3							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	6							0	0	0	0	NS	NS	0	0.81	0	13.91	NS	NS		
	10							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0	0	NS	NS	0	0.27	0	4.64	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		-	-	0.14 ± 0.33		2.32 ± 5.68		-	-		
Run Avgs.	S & B Avgs.							0.06	0	0	0	NS	NS	1.11	0.33	0.02	0.98	NS	NS		
	Overall							0.04 ± 0.18		0.01 ± 0.08		0.33 ± 0.57		0.66 ± 2.83		0.46 ± 2.31		0.21 ± 0.37			

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-11. Densities (Numbers/100 m^3) of Rainbow Smelt At Each Station, By Contour, 1975. (S & B* Averages Exclude Beach Stations 18-20)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	0		5.08		0		0.64		0		0		0		NS	
	19	0		3.64		0		0		0		0		0		NS	
	20	0		0		0		0		0		0		0		0	
	S & B Avg.	-		-		-		-		-		-		-		-	
	Cell Avg.	0 ± 0		2.91 ± 2.62		0 ± 0		0.21 ± 0.37		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
6-12	1	0.63	0	14.26	24.79	0	0	0	0	0	0	0	0	NS	NS	0	0
	4	26.21	41.23	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	7	16.49	29.15	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	11	NS	NS	4.54	13.24	0	0	0	0	0	0	0	0	NS	NS	0	0
	14	NS	NS	1.09	0.78	0	0	0	0	0	0	0	0	NS	NS	0	0
	17	NS	NS	0.66	0	0	0	0	0	0	0	0	0	NS	NS	1.16	0
	S & B Avg.	14.44	23.46	3.58	6.47	0	0	0	0	0	0	0	0	NS	NS	0.19	0
	Cell Avg.	18.95 ± 16.45		5.02 ± 8.07		0 ± 0		0 ± 0		0 ± 0		0 ± 0		-		0.10 ± 0.33	
12-18	5	6.06	9.61	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	8	15.37	33.48	0	0.69	0	0	0	0	0	0	0	0	NS	NS	0	0
	12	NS	NS	0.74	3.29	0	0	0	0	0	0	0	0	NS	NS	0	0
	15	NS	NS	22.55	30.77	0.73	0.33	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	11.17	21.54	5.82	8.69	0.18	0.08	0	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	16.35 ± 11.94		7.26 ± 12.22		0.13 ± 0.27		0 ± 0		0 ± 0		0 ± 0		-		0 ± 0	
18-24	2	0	0	0	0.32	0	0	0	0	0	0	0	0	NS	NS	0	0
	9	6.40	35.74	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	13	NS	NS	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	16	NS	NS	0.36	0.36	0	0	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	3.20	17.87	0.09	0.17	0	0	0	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	10.53 ± 17.07		0.13 ± 0.18		0 ± 0		0 ± 0		0 ± 0		0 ± 0		-		0 ± 0	
24-30	3	0.38	0	0.35	0.34	0	0	0	0	0	0	0	NS	NS	NS	0	0
	6	0	3.82	0	0	0	0	0.35	0	0	0	0	0	NS	NS	0	0
	10	NS	NS	0.36	2.07	0	0	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	0.19	1.91	0.24	0.80	0	0	0.12	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	1.05 ± 1.86		0.52 ± 0.78		0 ± 0		0.06 ± 0.14		0 ± 0		0 ± 0		-		0 ± 0	
Run Avgs.	S & B Avg.	8.05	17.00	2.70	4.51	0.04	0.02	0.02	0	0	0	0	0	NS	NS	0.07	0
	Overall	10.74 ± 14.00		3.55 ± 7.57		0.03 ± 0.13		0.03 ± 0.12		0 ± 0		0 ± 0		0 ± 0		0.03 ± 0.20	

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-12. Densities (Numbers/100 m^3) of Rainbow Smelt at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18		0		0.64		0		0		0		0		0		0				
	19		0		0		0		0		0		0		0		0				
	20		0		0		0		0		0		0		0		0				
	S & B Avgs.		-		-		-		-		-		-		-		-				
	Cell Avg.		0 ± 0		0.21 ± 0.37		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0				
6-12	1	NS	NS	0.44	0.78	0	0	0.91	0.36	0.74	3.19	NS	NS	0.58	0	0	1.45				
	4	NS	NS	0.44	0	0	0	1.32	0	1.10	0	NS	NS	0	0	0	0				
	7	NS	NS	0	0.39	NS	NS	0.38	1.07	0	1.48	NS	NS	0	0	0	0				
	11	NS	NS	0.76	0	NS	NS	0	0	0	0	NS	NS	0	0	0	0				
	14	NS	NS	1.32	0.40	NS	NS	0.75	5.99	0	0	NS	NS	0	0	0	0				
	17	NS	NS	1.36	0	NS	NS	1.76	1.18	0.47	0.44	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.72	0.26	0	0	0.85	1.43	0.38	0.85	NS	NS	0.10	0	0	0.24				
	Cell Avg.	-	-	0.49 ± 0.49		0 ± 0		1.14 ± 1.63		0.62 ± 0.95		-	-	0.05 ± 0.16		0.12 ± 0.42					
12-18	5	NS	NS	0	1.18	NS	NS	NS	NS	0	8.23	NS	NS	0	0	0	0				
	8	NS	NS	1.76	0.78	NS	NS	0	3.14	0	6.57	NS	NS	0	0	0	0				
	12	NS	NS	0	0.83	NS	NS	0	11.76	0	2.15	NS	NS	0	0	0	0				
	15	NS	NS	0	0	NS	NS	1.76	36.50	0	0.45	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.44	0.70	NS	NS	0.59	17.13	0	4.35	NS	NS	0	0	0	0				
	Cell Avg.	-	-	0.57 ± 0.68		-	-	8.86 ± 14.23		2.17 ± 3.34		-	-	0 ± 0		0 ± 0					
18-24	2	NS	NS	2.64	0.39	7.75	1.54	0.94	3.74	0	6.66	NS	NS	0	0	0	0				
	9	NS	NS	0	2.35	NS	NS	0.44	9.80	0	3.43	NS	NS	0	0	0	0				
	13	NS	NS	0	0	NS	NS	0	26.65	1.44	7.55	NS	NS	0	0	0	0				
	16	NS	NS	0	0	NS	NS	0.87	0.78	0.46	0.69	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.66	0.69	7.75	1.54	0.56	10.24	0.48	4.58	NS	NS	0	0	0	0				
	Cell Avg.	-	-	0.67 ± 1.13		4.64 ± 4.39		5.40 ± 9.17		2.53 ± 3.04		-	-	0 ± 0		0 ± 0					
24-30	3	NS	NS	0	10.97	14.99	31.15	2.64	5.49	0.71	6.47	NS	NS	0	0	0	0				
	6	NS	NS	NS	1.18	NS	NS	1.32	3.14	0	15.15	NS	NS	0	0	0	0				
	10	NS	NS	0	2.76	NS	NS	0	0.39	0	11.82	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0	4.97	14.99	31.15	1.32	3.00	0.24	11.15	NS	NS	0	0	0	0				
	Cell Avg.	-	-	2.98 ± 4.61		23.07 ± 11.43		2.16 ± 2.04		5.69 ± 6.59		-	-	0 ± 0		0 ± 0					
Run Avgs.	S & B Avgs.	NS	NS	0.54	1.29	5.68	8.17	0.82	6.87	0.29	4.37	NS	NS	0.03	0	0	0.08				
	Overall		0 ± 0		0.87 ± 1.90		5.54 ± 10.28		3.52 ± 7.61		2.14 ± 3.68		NS		0.02 ± 0.10		0.04 ± 0.24				

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-13. Densities (Numbers/100 m^3) of White Bass at Each Station, by Contour, 1975. (S & B * Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	2.54		30.50		0		0		0		0		0		NS	
	19	0.46		34.61		0		0.46		0		0		0		NS	
	20	64.89		23.42		0.98		0.49		0		0		0		0	
	S & B Avg.	-		-		-		-		-		-		-		-	
	Cell Avg.	22.63 ± 36.62		29.51 ± 5.66		0.32 ± 0.56		0.31 ± 0.27		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
6-12	1	0	0	1.07	2.07	0	0	0	0	0	0	0	0	NS	NS	0	0
	4	0.41	0	0	0.35	0	0	0	0	0	0	0	0	NS	NS	0	0
	7	0.42	2.52	0	0	0	0	0	0.32	0	0	0	0	NS	NS	0	0
	11	NS	NS	7.96	30.07	0.64	1.97	0	0	0	0	0	0	NS	NS	0.38	0
	14	NS	NS	216.32	262.93	15.75	9.39	0	0	0.38	2.70	0	0	NS	NS	0.77	0
	17	NS	NS	77.64	269.15	2.00	1.26	0.33	0	0	0	0	0	NS	NS	0.19	0
	S & B Avg.	0.28	0.84	50.50	94.09	3.96	2.10	0.06	0.05	0.06	0.45	0	0	-	-	0.10 ± 0.24	
	Cell Avg.	0.56 ± 0.98		72.30 ± 109.31		2.58 ± 4.22		0.06 ± 0.13		0.26 ± 0.78		0 ± 0					
12-18	5	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	8	0.38	3.38	0	0	0	0.36	0	0	0	0	0	0	NS	NS	0	0
	12	NS	NS	2.59	60.28	0	0.92	0	0	0	0	0	0	NS	NS	0	0.32
	15	NS	NS	85.62	10.49	1.09	0	0	0	0	0	0	0	NS	NS	0	0.08
	S & B Avg.	0.19	1.69	22.05	17.69	0.27	0.32	0	0	0	0	0	0	-	-	0.04 ± 0.11	
	Cell Avg.	0.94 ± 1.66		19.87 ± 33.64		0.30 ± 0.46		0 ± 0		0 ± 0		0 ± 0					
18-24	2	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	9	1.20	1.72	0	0.32	0	0	0	0	0	0	0	0	NS	NS	0	0
	13	NS	NS	0.33	12.02	0	1.01	0	1.79	0	0	0	0	NS	NS	0	0
	16	NS	NS	0.36	0.72	0.70	0.33	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	0.60	0.86	0.17	3.27	0.18	0.33	0	0.45	0	0	0	0	-	-	0 ± 0	
	Cell Avg.	0.73 ± 0.87		1.72 ± 4.17		0.26 ± 0.40		0.22 ± 0.63		0 ± 0		0 ± 0					
24-30	3	0	1.86	0	0	0	0	0	0	0	0	0	NS	NS	NS	0	0
	6	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	10	NS	NS	0	0.35	1.76	5.33	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	0	0.93	0	0.12	0.59	1.78	0	0	0	0	0	0	-	-	0 ± 0	
	Cell Avg.	0.46 ± 0.93		0.06 ± 0.14		1.18 ± 2.15		0 ± 0		0 ± 0		0 ± 0					
Run Avgs.	S & B Avg.	0.27	1.05	23.05	38.16	1.29	1.21	0.08	0.12	0.02	0.16	0	0	NS	NS	0.07	0.02
	Overall	3.80 ± 14.04		30.52 ± 69.68		1.18 ± 3.03		0.09 ± 0.31		0.08 ± 0.45		0 ± 0		0 ± 0		0.04 ± 0.15	

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-14. Densities (Numbers/100 m^3) of White Bass at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18							0		0		1.27		3.81		0		0			
	19							0		0		0		0		0		0.46			
	20							0		0.98		2.93		0.49		0		0			
	S & B Avgs.							-		-		-		-		-		-			
	Cell Avg.							0 ± 0		0.32 ± 0.56		1.40 ± 1.47		1.43 ± 2.08		0 ± 0		0.15 ± 0.26			
6-12	1							0	0	0	0	NS	NS	0	0	1.03	0	NS	NS		
	4							0	0	0	0	NS	NS	0	0.39	0	0	NS	NS		
	7							0	0	0.50	0	NS	NS	0	2.20	0	0	NS	NS		
	11							0	0	2.02	7.80	NS	NS	0	0	0	0	NS	NS		
	14							0	0.75	22.12	8.38	NS	NS	13.26	2.35	0	0	NS	NS		
	17							2.64	12.39	0.93	0	NS	NS	0	0	0.36	0	NS	NS		
	S & B Avgs.							0.44	2.19	4.26	2.70	NS	NS	2.21	0.82	0.23	0	NS	NS		
	Cell Avg.							1.31 ± 3.57		3.48 ± 6.61		-	-	1.52 ± 3.80		0.12 ± 0.31		-	-		
12-18	5							NS	NS	1.37	5.88	NS	NS	0	0	0	0	NS	NS		
	8							0	0	0	0.50	NS	NS	0	2.58	0	0.34	NS	NS		
	12							0	0	0	1.07	NS	NS	1.24	0	0	0.36	NS	NS		
	15							0	0	1.14	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0.63	1.86	NS	NS	0.31	0.65	0	0.18	NS	NS		
	Cell Avg.							0 ± 0		1.24 ± 1.95		-	-	0.48 ± 0.96		0.09 ± 0.16		-	-		
18-24	2							0	0	0.88	2.74	NS	NS	0	0	0	0	NS	NS		
	9							0.44	0	0.48	1.72	NS	NS	0	0	0	0	NS	NS		
	13							0	0	1.44	2.52	NS	NS	0.62	0.78	0	0	NS	NS		
	16							0	0	0.46	0.35	NS	NS	2.22	5.09	0	0	NS	NS		
	S & B Avgs.							0.11	0	0.82	1.83	NS	NS	0.71	1.47	0	0	NS	NS		
	Cell Avg.							0.06 ± 0.16		1.32 ± 0.94		-	-	1.09 ± 1.79		0 ± 0		-	-		
24-30	3							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	6							0	0	0	1.94	NS	NS	0	0	0	0	NS	NS		
	10							0	0	0.40	25.00	NS	NS	0.88	1.31	0	0	NS	NS		
	S & B Avgs.							0	0	0.14	8.98	NS	NS	0.29	0.44	0	0	NS	NS		
	Cell Avg.							0 ± 0		4.56 ± 10.04		-	-	0.36 ± 0.58		0 ± 0		-	-		
Run Avgs.	S & B Avgs.							0.19	0.82	1.87	3.41	NS	NS	1.07	0.86	0.08	0.04	NS	NS		
	Overall							0.46 ± 2.13		2.45 ± 5.51		1.40 ± 1.47		1.01 ± 2.39		0.06 ± 0.19		0.15 ± 0.27			

* S = Surface; B = Bottom; NS = No Sample

Appendix B

Table B-15. Densities (Numbers/100 m³) of all Species at Each Station, by Contour, 1975. (*S & B Averages Exclude Beach Stations 18-20).

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
0-6	18	65.45		2704.28		104.84		39.41		12.07		20.33		0		NS	
	19	7.74		721.31		116.58		14.12		36.88		8.20		0		NS	
	20	478.63		1170.96		445.04		2.44		21.47		8.29		0		0	
	S & B Avg.	-		-		-		-		-		-		-		-	
	Cell Avg.	183.94 ± 256.84		1532.18 ± 1039.67		222.45 ± 193.64		18.66 ± 18.90		23.48 ± 12.53		12.28 ± 6.98		0 ± 0		0 ± 0	
6-12	1	82.32	72.73	902.67	1204.54	30.63	1.66	93.57	90.58	1.76	1.83	1.44	2.28	NS	NS	5.75	13.22
	4	145.37	110.46	21.33	34.57	6.40	27.42	113.91	15.15	1.46	1.35	0.78	0.65	NS	NS	12.99	72.0
	7	83.72	55.78	0.33	5.09	49.26	61.50	6.39	1.62	1.94	1.03	0	1.74	NS	NS	0.39	0.34
	11	NS	NS	39.02	56.19	188.18	148.91	4.52	2.16	4.88	8.42	0.39	0	NS	NS	0.40	0
	14	NS	NS	1500.00	1430.64	1356.48	1564.58	10.10	7.55	15.28	6.55	21.26	6.55	NS	NS	1.93	0
	17	NS	NS	2501.00	549.75	1175.49	1175.21	48.10	23.57	2.57	0.69	1.06	0	NS	NS	3.47	0
	S & B Avg.	103.80	79.66	827.39	546.80	467.74	496.40	46.12	23.44	4.65	3.31	4.16	1.87	NS	NS	4.15	3.46
	Cell Avg.	91.73 ± 31.73		687.09 ± 823.57		482.07 ± 627.22		34.78 ± 41.29		3.98 ± 4.30		3.01 ± 6.02		-		3.81 ± 4.96	
12-18	5	9.83	11.46	1.31	4.36	118.45	71.75	96.36	12.04	3.15	0.98	1.97	0	NS	NS	0	0
	8	141.40	62.65	2.49	4.51	68.52	30.06	1.13	1.33	0	0	0.78	0	NS	NS	1.16	0
	12	NS	NS	28.46	363.64	44.04	64.50	25.13	5.68	1.62	0	1.14	0	NS	NS	0	0
	15	NS	NS	711.06	119.23	153.46	91.89	8.09	5.65	0.74	0	0.41	0	NS	NS	5.39	0.63
	S & B Avg.	75.61	37.06	185.83	123.06	96.12	64.55	32.83	6.15	1.38	0.25	1.07	0	NS	NS	1.64	0.16
	Cell Avg.	56.33 ± 61.79		154.44 ± 256.03		80.33 ± 40.07		19.49 ± 32.00		0.81 ± 1.12		0.54 ± 0.72		-		0.90 ± 1.86	
18-24	2	4.17	0.38	133.48	221.23	38.35	24.22	10.94	12.73	2.86	4.27	2.18	1.00	NS	NS	1.25	0
	9	207.48	108.06	11.86	0.07	122.75	42.56	17.43	2.66	24.94	0	0	0	NS	NS	0	0
	13	NS	NS	15.71	139.74	26.79	121.55	7.69	5.37	12.45	0	0.41	0	NS	NS	0.41	0
	16	NS	NS	4.26	4.69	2.82	5.21	7.52	0.85	0.77	0	1.15	0	NS	NS	0	0
	S & B Avg.	105.83	54.22	41.33	91.66	47.68	48.39	10.89	5.40	10.26	1.07	0.94	0.25	NS	NS	0.41	0
	Cell Avg.	80.02 ± 98.54		66.49 ± 85.65		48.03 ± 47.82		8.15 ± 5.43		5.66 ± 8.84		0.59 ± 0.80		-		0.21 ± 0.44	
24-30	3	9.95	4.17	38.11	136.02	2.28	5.26	111.67	4.39	9.70	0.64	0.67	NS	NS	NS	0	0
	6	0.78	14.44	43.95	57.43	49.90	40.34	20.08	7.65	5.01	3.15	18.70	1.14	NS	NS	0	0
	10	NS	NS	34.05	11.71	47.92	59.30	94.64	5.51	0.76	0	19.70	1.20	NS	NS	0	0
	S & B Avg.	5.31	9.31	36.70	68.39	33.37	34.96	75.76	5.85	5.16	1.26	13.02	1.17	NS	NS	0	0
	Cell Avg.	7.31 ± 6.95		53.55 ± 43.08		34.17 ± 24.33		40.81 ± 48.96		3.21 ± 3.70		8.28 ± 9.98		-		0 ± 0	
Run Avg.	S & B Avg.	76.10	48.90	352.30	255.58	204.81	207.94	39.93	12.03	5.29	1.70	4.24	0.91	NS	NS	1.95	1.26
	Overall	79.85 ± 108.23		403.53 ± 688.64		207.68 ± 403.15		25.38 ± 35.00		5.11 ± 8.06		3.43 ± 6.30		0 ± 0		1.56 ± 3.40	

* S = Surface; B = Bottom; NS = No Sample

Table B-16. Densities (Numbers/100 m^3) of All Species at Each Station, by Contour, 1976. (S & B* Averages Exclude Beach Stations 18-20.)

Contours (ft.)	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
0-6	18		1.27		1.27		0.64		50.22		0		14582.96		127.78		1.27		22.25		3.81
	19		0		18.22		4.55		2.73		31.88		4.10		5.47		2.28		16.40		34.62
	20		0		0.49		NS		1.95		24.87		8.78		2.93		0.49		0.49		5.85
	S & B Avgs.		-		-		-		-		-		-		-		-		-		-
	Cell Avg.		0.42 ± 0.73		6.66 ± 10.02		2.60 ± 2.77		18.30 ± 27.65		18.92 ± 16.75		4365.3 ± 8415.8		45.39 ± 71.36		1.35 ± 0.90		13.05 ± 11.26		14.76 ± 17.22
6-12	1	NS	NS	0.44	1.96	1.84	0	1.52	2.48	3.34	9.57	NS	NS	36.71	12.27	11.36	14.51	NS	NS	NS	NS
	4	NS	NS	1.32	1.18	0	0	8.34	4.31	903.61	687.50	NS	NS	24.16	11.36	2.34	0	NS	NS	7.58	1.23
	7	NS	NS	1.32	3.53	NS	NS	3.82	2.67	53.54	37.55	NS	NS	0	3.07	1.54	0.40	NS	NS	1.34	0.54
	11	NS	NS	3.82	9.43	NS	NS	7.90	6.27	73.74	126.62	NS	NS	2.27	0.39	9.66	2.42	NS	NS	1.16	0
	14	NS	NS	3.29	10.28	NS	NS	19.86	34.79	402.06	269.80	NS	NS	32.20	6.66	10.33	1.55	NS	NS	0.37	0.43
	17	NS	NS	2.73	9.59	NS	NS	82.56	106.04	1572.96	297.64	NS	NS	0.58	1.57	5.01	7.03	NS	NS	0	6.99
	S & B Avgs.	NS	NS	2.15	5.99	0.92	0	20.67	25.65	501.54	238.10	NS	NS	15.97	5.89	6.71	4.32	NS	NS	2.09	1.84
	Cell Avg.	-	-	4.07 ± 3.59		0.46 ± 0.92		23.38 ± 34.81		369.83 ± 473.96		-	-	10.94 ± 13.05		5.51 ± 4.91		-	-	1.96 ± 2.85	
12-18	5	NS	NS	0	1.18	NS	NS	NS	NS	102.46	62.70	NS	NS	25.28	5.59	2.48	0.38	NS	NS	0.85	NS
	8	NS	NS	3.07	1.18	NS	NS	0.63	3.92	78.92	22.73	NS	NS	1.55	8.78	3.47	0.34	NS	NS	3.72	0.43
	12	NS	NS	0.44	1.24	NS	NS	1.76	12.54	106.06	13.60	NS	NS	4.36	1.60	1.11	1.09	NS	NS	1.09	0
	15	NS	NS	2.23	9.50	NS	NS	9.22	74.72	603.98	13.82	NS	NS	3.83	0	15.87	5.92	NS	NS	0	0
	S & B Avgs.	NS	NS	1.44	3.27	NS	NS	3.87	30.39	222.86	28.21	NS	NS	8.76	3.99	5.73	1.93	NS	NS	1.42	0.14
	Cell Avg.	-	-	2.35 ± 3.04		-	-	17.13 ± 28.58		125.53 ± 196.95		-	-	6.38 ± 8.12		3.83 ± 5.21		-	-	0.87 ± 1.33	
18-24	2	NS	NS	2.64	0.39	11.36	13.35	7.54	12.84	38.65	11.36	NS	NS	65.22	77.46	21.82	69.57	NS	NS	NS	NS
	9	NS	NS	0.44	2.35	NS	NS	1.76	16.85	11.61	10.72	NS	NS	3.42	3.00	1.67	1.26	NS	NS	2.57	0.65
	13	NS	NS	0	0	NS	NS	1.32	27.43	22.01	19.05	NS	NS	11.21	3.53	81.05	12.69	NS	NS	0.33	0
	16	NS	NS	1.44	0.31	NS	NS	2.63	1.18	574.22	21.17	NS	NS	61.53	54.55	57.11	2.08	NS	NS	0.37	0
	S & B Avgs.	NS	NS	1.13	0.76	11.36	13.35	3.31	14.57	161.62	15.58	NS	NS	35.34	34.64	40.41	21.40	NS	NS	1.09	0.22
	Cell Avg.	-	-	0.95 ± 1.06		12.36 ± 1.41		8.94 ± 9.50		88.60 ± 196.43		-	-	34.99 ± 32.47		30.90 ± 33.11		-	-	0.65 ± 0.97	
24-30	3	NS	NS	0	10.97	26.11	42.69	3.51	5.49	31.72	64.01	NS	NS	75.94	44.54	509.23	57.62	NS	NS	NS	NS
	6	NS	NS	NS	1.57	NS	NS	13.62	15.67	5.25	20.59	NS	NS	188.81	160.72	14.78	16.62	NS	NS	NS	NS
	10	NS	NS	0.41	2.76	NS	NS	0	0.39	14.56	40.91	NS	NS	1.32	3.93	9.78	0.73	NS	NS	0.57	0
	S & B Avgs.	NS	NS	0.21	5.10	26.11	42.69	5.71	7.18	17.18	41.84	NS	NS	88.69	69.73	177.93	24.99	NS	NS	0.57	0
	Cell Avg.	-	-	3.14 ± 4.51		34.40 ± 11.72		6.45 ± 6.70		29.51 ± 21.06		-	-	79.21 ± 79.50		101.46 ± 200.73		-	-	0.28 ± 0.40	
Run Avgs.	S & B Avgs.	NS	NS	1.47	3.96	9.83	14.01	10.37	20.48	270.51	101.72	NS	NS	31.67	23.47	44.62	11.42	NS	NS	1.53	0.86
	Overall		0.42 ± 0.73	3.08 ± 4.10		10.05 ± 14.24		15.67 ± 25.10		172.56 ± 322.75		4365.3 ± 8415.8		29.01 ± 45.87		25.86 ± 84.12		13.05 ± 11.26		2.66 ± 6.62	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-1. Densities (Numbers/100 m^3) of Yellow Perch at Each Station, by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20).

Transect	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
	1	0.42	0	7.13	6.20	0	0.33	3.70	0.33	0	0	0	0				
	2	0	0	0	0.64	0	0	0	0	0	0	0	0.33				
1	3	0	0	0	1.02	0	0	0	0	0	0.32	0	NS				
	S & B Avg.	0.14	0	2.38	2.62	0	0.11	1.00	0.11	0	0.11	0	0.17				
	Cell Avg.	0.07 ± 0.17		2.50 ± 3.26		0.06 ± 0.14		0.56 ± 1.20		0.05 ± 0.13		0.07 ± 0.15					
	4	0	0.53	0	0.35	0	0	0.36	0.32	0	0	0	0				
	5	0.82	0.37	0	1.04	0	0	0	0	0	0	0	0				
2	6	0	0	0	0.31	0	0	0.35	1.22	0	0	0	0				
	18	0.64		0		0		0		0		0					
	S & B Avg.	0.27	0.30	0	0.56	0	0	0.24	0.52	0	0	0	0				
	Cell Avg.	0.34 ± 0.34		0.24 ± 0.38		0 ± 0		0.32 ± 0.43		0 ± 0		0 ± 0					
	7	0.42	0	0	0	0	0	0	0	0	0	0	0.34				
	8	0	0	0	0	0	0	0	0	0	0	0	0				
3	9	0.40	0.57	0	0	0	0	0	0	0	0	0	0				
	10	NS	NS	0.36	1.72	0	0	0	0	0	0	0.38	0				
	19	0		0		0		0		0		0					
	S & B Avg.	0.27	0.19	0.09	0.43	0	0	0	0	0	0	0.10	0.09				
	Cell Avg.	0.20 ± 0.25		0.23 ± 0.57		0 ± 0		0 ± 0		0 ± 0		0.08 ± 0.16					
	11	NS	NS	6.06	5.01	0	0	0	0	0	0	0	0				
4	12	NS	NS	1.11	0	0	0	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	NS	NS	2.39	1.67	0	0	0	0	0	0	0	0				
	Cell Avg.	-	-	2.03 ± 2.77		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
	14	NS	NS	4.08	1.57	0	0	0	0	0	0	0	0				
	15	NS	NS	5.99	2.10	0	0	0	0	0	0	0	0				
5	16	NS	NS	0	0.72	0	0	0	0	0	0	0	0				
	20	46.35		3.90		0		0		0		0					
	S & B Avg.	NS	NS	3.66	1.46	0	0	0	0	0	0	0	0				
	Cell Avg.	46.35 ± 0		2.75 ± 2.25		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
6	17	NS	NS	1.00	11.45	0	0	0	0	0	0.35	0	0				
	Cell Avg.	-	-	6.22 ± 7.40		0 ± 0		0 ± 0		0.17 ± 0.24		0 ± 0					
Run Avgs.	S & B Avg.	0.23	0.16	1.57	1.89	0	0.02	0.22	0.11	0	0.04	0.02	0.04				
	Overall	2.30 ± 9.84		1.69 ± 2.73		0.01 ± 0.06		0.15 ± 0.53		0.02 ± 0.08		0.03 ± 0.10					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-2. Densities (Numbers/100 m³) of Yellow Perch at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1	NS	NS	0	1.18	1.84	0	0.61	1.78	0	0.80	NS	NS	0.58	0	0.52	0.97				
	2	NS	NS	0	0	3.62	11.81	6.59	8.56	0	0.78	NS	NS	0	0.73	0	1.86				
	3	NS	NS	0	0	11.12	11.54	0.88	0	0.24	0	NS	NS	0.54	0.91	0	1.74				
	S & B Avg.	NS	NS	0	0.39	5.52	7.78	2.69	3.44	0.08	0.53	NS	NS	0.37	0.55	0.17	1.51				
	Cell Avg.	-	-	0.20 ± 0.48		6.65 ± 5.42		3.07 ± 3.59		0.30 ± 0.39		-	-	0.46 ± 0.38		0.85 ± 0.82					
2	4	NS	NS	0.88	1.18	0	0	0	1.96	0	0	NS	NS	0	0.39	0.33	0				
	5	NS	NS	0	0	NS	NS	NS	NS	0	0.39	NS	NS	0	0.35	0	0				
	6	NS	NS	NS	0	NS	NS	12.30	12.54	0	0	NS	NS	0.58	0.41	0	1.70				
	18	0		0		0		47.68		0		0.64		0		0					
	S & B Avg.	NS	NS	0.44	0.39	0	0	6.15	7.25	0	0.13	NS	NS	0.19	0.38	0.11	0.56				
	Cell Avg.	0 ± 0		0.34 ± 0.54		0 ± 0		14.90 ± 19.21		0.06 ± 0.15		0.64 ± 0		0.25 ± 0.24		0.29 ± 0.63					
3	7	NS	NS	1.32	2.74	NS	NS	3.44	1.60	0	0	NS	NS	0	0.44	0	0				
	8	NS	NS	0.44	0.39	NS	NS	0	0.78	0	0	NS	NS	0	0.52	0	0				
	9	NS	NS	0	0	NS	NS	0	1.96	0	0.86	NS	NS	0	0	0	0				
	10	NS	NS	0	0	NS	NS	0	0	4.45	1.36	NS	NS	0	0	0	0				
	19	0		0.91		2.73		1.82		1.37		0		0		0					
	S & B Avg.	NS	NS	0.44	0.78	NS	NS	0.86	1.09	1.11	0.56	NS	NS	0	0.24	0	0				
	Cell Avg.	0 ± 0		0.64 ± 0.92		2.73 ± 0		1.07 ± 1.22		0.89 ± 1.46		0 ± 0		0.11 ± 0.21		0 ± 0					
4	11	NS	NS	1.53	9.00	NS	NS	0.88	1.57	0.50	0.46	NS	NS	0	0	0	0				
	12	NS	NS	0	0.41	NS	NS	0.44	0.39	0	0.36	NS	NS	0	0	0.37	0				
	13	NS	NS	0	0	NS	NS	0.44	0.78	0.48	1.08	NS	NS	0	0	0	1.76				
	S & B Avg.	NS	NS	0.51	3.14	NS	NS	0.58	0.91	0.33	0.63	NS	NS	0	0	0.12	0.59				
	Cell Avg.	-	-	1.82 ± 3.57		-	-	0.75 ± 0.45		0.48 ± 0.35		-	-	0 ± 0		0.36 ± 0.70					
5	14	NS	NS	0.33	9.88	NS	NS	5.24	1.12	0	0	NS	NS	0	0	0	0				
	15	NS	NS	1.78	8.68	NS	NS	0.88	0.34	0	0	NS	NS	0	0	0	0				
	16	NS	NS	0.96	0	NS	NS	0	0	0	0	NS	NS	0	1.09	0.39	0				
	20	0		0		NS		1.95		4.39		0.49		0		0					
	S & B Avg.	NS	NS	1.02	6.19	NS	NS	2.04	0.49	0	0	NS	NS	0	0.36	0.13	0				
	Cell Avg.	0 ± 0		3.09 ± 4.29		-	-	1.36 ± 1.84		0.63 ± 1.66		0.49 ± 0		0.16 ± 0.41		0.06 ± 0.15					
6	17	NS	NS	0.91	9.59	NS	NS	1.32	0	0	0.44	NS	NS	0	0	0	0				
	Cell Avg.	-	-	5.25 ± 6.14		-	-	0.66 ± 0.93		0.22 ± 0.31		-	-	0 ± 0		0 ± 0					
Run Avgs.	S & B Avg.	NS	NS	0.51	2.53	4.14	5.84	2.06	2.59	0.33	0.38	NS	NS	0.10	0.28	0.10	0.47				
	Overall	0 ± 0		1.45 ± 2.89		4.27 ± 5.14		3.37 ± 8.35		0.49 ± 1.03		0.38 ± 0.33		0.18 ± 0.30		0.26 ± 0.57					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-3. Densities (Numbers/100 m³) of Clupeids at Each Station by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20.)

		Run: 1		2		3		4		5		6		7		8	
Transect	Stations	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B
1	1	74.15	69.50	874.87	1167.36	0.99	1.00	67.27	85.60	1.76	1.83	0.72	0.98	NS	NS	5.75	11.98
	2	0	0.38	133.12	218.69	38.02	24.22	7.18	10.30	1.79	4.27	1.82	0.66	NS	NS	1.25	0
	3	0.76	1.86	32.17	132.63	1.96	5.26	86.61	3.04	7.55	0.32	0.07	NS	NS	NS	0	0
	S & B Avg.	24.97	23.91	346.72	506.23	13.65	10.16	53.69	32.98	3.70	2.14	1.07	0.82	NS	NS	2.33	3.99
	Cell Avg.	24.44 ± 36.74		426.47 ± 473.50		11.91 ± 15.59		43.33 ± 40.63		2.92 ± 2.60		0.97 ± 0.49		-	-	3.16 ± 4.86	
2	4	106.88	61.84	20.98	33.18	5.72	27.42	49.95	12.90	1.09	0.34	0.39	0	NS	NS	12.99	4.92
	5	0.82	1.48	0.33	2.78	116.12	68.71	68.36	12.94	2.45	0.66	1.97	0	NS	NS	0	0
	6	0	10.20	42.97	57.12	6.84	36.61	6.99	6.12	3.94	3.15	18.70	1.14	NS	NS	0	0
	18	56.55		2643.28		81.33		31.15		0		10.17		0		NS	
	S & B Avg.	35.90	24.50	21.13	31.03	42.90	44.25	41.77	10.35	2.49	1.38	7.02	0.78	NS	NS	4.33	1.64
	Cell Avg.	33.97 ± 41.79		399.96 ± 989.42		48.96 ± 41.25		26.79 ± 24.20		1.66 ± 1.52		4.62 ± 7.17		0 ± 0		2.98 ± 5.28	
3	7	65.96	23.39	0.33	5.09	46.72	61.50	4.13	0.65	0	0.34	0	0	NS	NS	0.39	0
	8	124.49	24.26	2.49	3.12	44.45	27.92	1.13	0.66	0	0	0	0	NS	NS	1.16	0
	9	198.69	69.47	7.55	0	81.96	41.26	12.64	2.66	24.94	0	0	0	NS	NS	0	0
	10	NS	NS	27.53	6.89	40.52	52.91	11.53	4.28	0.76	0	19.32	1.20	NS	NS	0	0
	19	2.28		675.77		112.48		9.56		4.55		6.83		0		NS	
	S & B Avg.	129.71	39.04	9.47	3.77	53.41	45.90	7.36	2.07	6.42	0.09	4.83	0.30	NS	NS	0.39	0
	Cell Avg.	72.65 ± 68.74		80.97 ± 223.20		56.64 ± 25.90		5.25 ± 4.75		3.40 ± 8.21		3.04 ± 6.50		0 ± 0		0.19 ± 0.41	
4	11	NS	NS	14.77	5.73	158.30	126.68	3.20	1.44	0.75	1.40	0	0	NS	NS	0	0
	12	NS	NS	19.59	298.09	15.86	55.90	9.98	1.24	0.81	0	0	0	NS	NS	0	0
	13	NS	NS	2.34	9.02	14.99	114.32	4.34	3.58	0	0	0	0	NS	NS	0.41	0
	S & B Avg.	NS	NS	12.23	104.28	63.05	99.13	5.84	2.08	0.52	0.47	0	0	NS	NS	0.14	0
	Cell Avg.	-	-	58.26 ± 117.66		81.09 ± 60.72		3.96 ± 3.19		0.49 ± 0.59		0 ± 0		-	-	0.07 ± 0.17	
5	14	NS	NS	1273.96	974.92	1273.44	1529.69	9.76	7.55	14.13	3.38	21.26	5.78	NS	NS	0	0
	15	NS	NS	558.49	74.13	136.73	87.31	4.01	5.65	0.37	0	0	0	NS	NS	0	0
	16	NS	NS	0	1.44	1.06	4.89	4.78	0	0	0	0	0	NS	NS	0	0
	20	349.34		1139.74		401.05		0		0		7.81		0		0	
	S & B Avg.	NS	NS	610.52	350.16	470.41	540.63	6.19	4.40	4.84	1.13	7.09	1.93	NS	NS	0	0
	Cell Avg.	349.34 ± 0		670.30 ± 546.22		490.60 ± 640.83		4.54 ± 3.63		2.56 ± 5.25		4.98 ± 7.88		0 ± 0		0 ± 0	
6	17	NS	NS	1916.72	103.08	931.07	1157.60	43.46	23.57	2.57	0.37	0.36	0	NS	NS	1.54	0
	Cell Avg.	-	-	1009.90 ± 1284.44		1044.33 ± 160.18		33.52 ± 14.07		1.46 ± 1.57		0.18 ± 0.25		-	-	0.77 ± 1.09	
Run Avgs.	S & B Avg.	63.53	29.15	289.79	181.96	171.46	201.39	23.26	10.66	3.70	0.94	3.84	0.61	NS	NS	1.38	1.00
	Overall	59.16 ± 84.48		337.26 ± 610.48		187.39 ± 379.24		16.68 ± 24.15		2.26 ± 4.70		2.77 ± 5.74		0 ± 0		1.15 ± 3.11	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-4. Densities (Numbers/100 m³) of Clupeids at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1	NS	NS	0	0	0	0	0	0	0.37	5.58	NS	NS	32.63	9.74	6.72	6.29	NS	NS	NS	NS
	2	NS	NS	0	0	0	0	0	0	36.01	1.18	NS	NS	42.82	75.64	4.85	64.32	NS	NS	NS	NS
	3	NS	NS	0	0	0	0	0	0	29.83	56.86	NS	NS	69.52	43.64	484.62	55.01	NS	NS	NS	NS
	S & B Avg.	NS	NS	0	0	0	0	0	0	22.07	21.21	NS	NS	48.32	43.00	165.40	41.87	NS	NS	NS	NS
	Cell Avg.	-	-	0 ± 0		0 ± 0		0 ± 0		21.64 ± 22.99		-	-	45.66 ± 24.25		103.63 ± 188.52		-	-	-	-
2	4	NS	NS	0	0	0	0	2.20	0	898.14	687 50	NS	NS	6.59	8.62	2.00	0	NS	NS	7.58	1.23
	5	NS	NS	0	0	NS	NS	NS	NS	99.73	44.28	NS	NS	2.15	4.19	2.07	0	NS	NS	0.85	NS
	6	NS	NS	NS	0	NS	NS	0	0	0.96	1.55	NS	NS	154.43	146.10	9.61	0	NS	NS	NS	NS
	18	0		0		0		0		0		14567.70		120.79		0		17.80		3.81	
	S & B Avg.	NS	NS	0	0	0	0	1.10	0	332.94	244.44	NS	NS	54.39	52.97	4.56	0	NS	NS	4.21	1.23
	Cell Avg.	0 ± 0		0 ± 0		0 ± 0		0.44 ± 0.98		247.45 ± 379.16		14567.70 ± 0		63.27 ± 72.92		1.95 ± 3.51		17.80 ± 0		3.37 ± 3.10	
3	7	NS	NS	0	0.39	NS	NS	0	0	53.03	36.07	NS	NS	0	0.44	0	0	NS	NS	1.34	0.54
	8	NS	NS	0.44	0	NS	NS	0.44	0	78.92	15.15	NS	NS	1.55	5.16	2.31	0	NS	NS	3.72	0.43
	9	NS	NS	0	0	NS	NS	0.88	3.53	10.64	3.43	NS	NS	1.96	0	1.67	0	NS	NS	2.57	0.65
	10	NS	NS	0	0	NS	NS	0	0	7.68	2.73	NS	NS	0.44	0.44	4.89	0.36	NS	NS	0.57	0
	19	0		0		0		0		27.33		3.19		5.47		0		2.73		34.62	
	S & B Avg.	NS	NS	0.11	0.10	NS	NS	0.33	0.88	37.57	14.34	NS	NS	0.99	1.51	2.22	0.09	NS	NS	2.05	0.41
	Cell Avg.	0 ± 0		0.09 ± 0.18		0 ± 0		0.54 ± 1.16		26.11 ± 25.92		3.19 ± 0		1.72 ± 2.15		1.03 ± 1.68		2.73 ± 0		4.94 ± 11.19	
4	11	NS	NS	0	0.43	NS	NS	5.71	4.70	71.21	111.93	NS	NS	2.27	0.39	0.88	0	NS	NS	1.16	0
	12	NS	NS	0	0	NS	NS	1.32	0.39	102.27	10.02	NS	NS	1.87	1.07	0.74	0.73	NS	NS	1.09	0
	13	NS	NS	0	0	NS	NS	0.88	0	12.44	7.19	NS	NS	9.34	1.96	71.18	10.57	NS	NS	0.33	0
	S & B Avg.	NS	NS	0	0.14	NS	NS	2.64	1.70	61.98	43.05	NS	NS	4.49	1.14	24.27	3.77	NS	NS	0.86	0
	Cell Avg.	-	-	0.07 ± 0.18		-	-	2.17 ± 2.42		52.51 ± 48.62		-	-	2.82 ± 3.27		14.02 ± 28.29		-	-	0.43 ± 0.55	
5	14	NS	NS	1.65	0	NS	NS	13.47	26.56	376.04	233.35	NS	NS	16.41	4.31	0	0	NS	NS	0.37	0.43
	15	NS	NS	0.45	0	NS	NS	6.15	37.88	586.94	5.79	NS	NS	3.83	0	1.72	2.96	NS	NS	0	0
	16	NS	NS	0	0	NS	NS	0	0	559.83	14.57	NS	NS	57.10	47.27	1.17	1.01	NS	NS	0.37	0
	20	0		0		NS		0		18.04		1.95		1.95		0		0.49		5.85	
	S & B Avg.	NS	NS	0.70	0	NS	NS	6.54	21.48	507.60	84.57	NS	NS	25.78	17.19	0.96	1.32	NS	NS	0.24	0.14
	Cell Avg.	0 ± 0		0.30 ± 0.62		-	-	12.01 ± 15.00		256.37 ± 256.34		1.95 ± 0		18.70 ± 23.64		0.98 ± 1.11		0.49 ± 0		1.00 ± 2.15	
6	17	NS	NS	0	0	NS	NS	76.86	92.08	1527.74	283.22	NS	NS	0.58	0.78	0.72	4.22	NS	NS	0	6.99
	Cell Avg.	-	-	0 ± 0		-	-	84.47 ± 10.77		905.48 ± 880.01		-	-	0.68 ± 0.15		2.47 ± 2.48		-	-	3.50 ± 4.94	
Run Avgs.	S & B Avg.	NS	NS	0.16	0.05	0	0	6.74	10.33	261.87	89.44	NS	NS	23.73	20.57	35.01	8.56	NS	NS	1.53	0.86
	Overall	0 ± 0		0.09 ± 0.30		0 ± 0		7.80 ± 20.79		162.64 ± 317.39		4857.6 ± 8409.2		23.82 ± 40.94		20.02 ± 80.39		7.01 ± 9.41		2.66 ± 6.62	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-5. Densities (Numbers/100 m³) of Shiners at Each Station by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20)

Transect	Station	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
1	1	4.19	2.42	3.56	0	0	0	20.98	1.33	0	0	0	0	NS	NS	0	1.24
	2	0	0	0.36	0.64	0.33	0	2.73	2.12	1.07	0	0.36	0	NS	NS	0	0
	3	4.92	0.46	5.59	1.70	0.33	0	24.34	1.01	2.16	0	0	NS	NS	NS	0	0
	S & B Avg.	3.04	0.92	3.17	0.78	0.22	0	16.02	1.49	1.08	0	0.12	0	NS	NS	0	0.41
	Cell Avg.	2.00 ± 2.18		1.98 ± 2.19		0.11 ± 0.17		8.75 ± 10.84		0.54 ± 0.90		0.07 ± 0.16		-	-	0.21 ± 0.51	
2	4	4.50	1.59	0.35	0	0.67	0	61.80	1.93	0	0	0	0	NS	NS	0	2.27
	5	1.23	0	0.33	0.35	1.33	2.13	27.27	0	0.70	0.33	0	0	NS	NS	0	0
	6	0.78	0.42	1.50	0	43.06	3.41	12.59	0	0.72	0	0	0	NS	NS	0	0
	18	4.45		0		17.17		3.18		3.81		9.53		0		NS	
	S & B Avg.	2.17	0.67	0.73	0.12	15.02	1.85	33.89	0.64	0.47	0.11	0	0	NS	NS	0	0.76
	Cell Avg.	1.85 ± 1.86		0.36 ± 0.51		9.68 ± 15.87		15.25 ± 22.76		0.29 ± 0.35		1.36 ± 3.60		0 ± 0		0.38 ± 0.93	
3	7	0	0.72	0	0	2.54	0	1.13	0.55	1.04	0.69	0	1.39	NS	NS	0	0.34
	8	0	0	0	0.35	23.06	1.07	0	0	0	0	0.39	0	NS	NS	0	0
	9	0.40	0	4.31	0.65	40.44	1.30	4.78	0	0	0	0	0	NS	NS	0	0
	10	NS	NS	5.80	0.69	5.28	0	83.11	1.22	0	0	0	0	NS	NS	0	0
	19	6.83		1.82		2.73		1.37		27.78		1.37		0		NS	
	S & B Avg.	0.13	0.24	2.53	0.42	17.83	0.59	22.26	0.47	0.49	0.17	0.10	0.35	NS	NS	0	0.09
	Cell Avg.	1.14 ± 2.53		1.51 ± 2.12		8.49 ± 13.98		10.25 ± 27.36		3.38 ± 9.17		0.35 ± 0.60		0 ± 0		0.04 ± 0.12	
4	11	NS	NS	2.27	0	22.57	15.10	1.06	0	3.38	6.32	0	0.64	NS	NS	0.40	0
	12	NS	NS	3.70	0.33	27.84	5.22	14.78	4.34	0.81	0	0.76	0	NS	NS	0	0
	13	NS	NS	13.04	118.71	11.80	5.39	3.34	0	12.45	0	0.41	0	NS	NS	0	0
	S & B Avg.	NS	NS	6.33	39.68	20.74	8.57	6.40	1.45	5.55	2.11	0.39	0.22	NS	NS	0.13	0
	Cell Avg.	-	-	23.01 ± 47.13		14.65 ± 9.16		3.92 ± 5.61		3.83 ± 4.88		0.30 ± 0.35		-	-	0.07 ± 0.16	
5	14	NS	NS	1.09	6.56	57.27	16.10	0.34	0	0	0	0	0.38	NS	NS	1.54	0
	15	NS	NS	33.83	0.35	14.18	3.27	4.68	0	0.37	0	0.41	0	NS	NS	5.39	0.32
	16	NS	NS	3.55	1.44	1.06	0	2.05	0.85	0.77	0	0.77	0	NS	NS	0	0
	20	0.49		3.90		41.96		1.46		21.47		0		0		0	
	S & B Avg.	NS	NS	13.12	2.72	24.17	6.46	2.36	0.28	0.38	0	0.39	0.13	NS	NS	2.31	0.10
	Cell Avg.	0.49 ± 0		7.39 ± 11.84		19.12 ± 22.19		1.34 ± 1.66		3.23 ± 8.05		0.22 ± 0.30		0 ± 0		1.04 ± 2.00	
6	17	NS	NS	0.33	0	241.76	16.36	3.98	0	0	0	0.36	0	NS	NS	0	0.34
	Cell Avg.	-	-	0.17 ± 0.24		129.06 ± 159.38		1.99 ± 2.82		0 ± 0		0.18 ± 0.25		-	-	0.17 ± 0.24	
Run Avgs.	S & B Avg.	1.78	0.62	4.74	7.76	29.03	4.08	15.82	0.79	1.43	0.43	0.20	0.15	NS	NS	0.43	0.26
	Overall	1.59 ± 2.09		5.89 ± 19.05		16.88 ± 40.74		7.80 ± 17.29		2.29 ± 5.94		0.47 ± 1.60		0 ± 0		0.34 ± 1.01	

* S = Surface, B = Bottom; NS = No Sample

Appendix C

Table C-6. Densities (Numbers/100 m³) of Shiners at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1							0	0	0	0	NS	NS	1.17	0.72	3.10	0	NS	NS		
	2							0	0	0.88	0	NS	NS	21.08	0.73	16.97	2.78	NS	NS		
	3							0	0	0.95	0.68	NS	NS	4.81	0	23.58	0.58	NS	NS		
	S & B Avgs.							0	0	0.61	0.23	NS	NS	9.02	0.48	14.46	1.12	NS	NS		
	Cell Avg.							0 ± 0		0.42 ± 0.47		-	-	4.75 ± 8.18		7.79 ± 9.88		-	-		
2	4							2.20	0.78	4.38	0	NS	NS	0.44	0	0	0	NS	NS		
	5							NS	NS	1.37	1.96	NS	NS	23.13	0.35	0	0.38	NS	NS		
	6							0	0	3.82	1.16	NS	NS	31.47	13.39	4.80	1.02	NS	NS		
	18							1.91		0		10.81		1.27		0.64		3.81			
	S & B Avgs.							1.10	0.39	3.19	1.04	NS	NS	18.35	4.58	1.60	0.47	NS	NS		
	Cell Avg.							0.98 ± 1.04		1.81 ± 1.72		10.81 ± 0		10.01 ± 12.95		0.98 ± 1.73		3.81 ± 0			
3	7							0	0	0	0	NS	NS	0	0	1.54	0	NS	NS		
	8							0.19	0	0	0	NS	NS	0	0	1.16	0	NS	NS		
	9							0	0.78	0.48	0.86	NS	NS	1.47	1.27	0	0	NS	NS		
	10							0	0	2.02	0	NS	NS	0	0	4.40	0.36	NS	NS		
	19							0.46		2.73		0.91		0		2.28		12.75			
	S & B Avgs.							0.05	0.20	0.63	0.21	NS	NS	0.37	0.32	1.77	0.09	NS	NS		
	Cell Avg.							0.16 ± 0.28		0.68 ± 1.02		0.91 ± 0		0.31 ± 0.61		1.08 ± 1.49		12.75 ± 0			
4	11							0.44	0	0	0	NS	NS	0	0	8.78	2.42	NS	NS		
	12							0	0	3.25	0	NS	NS	1.24	0	0	0	NS	NS		
	13							0	0	5.74	0	NS	NS	1.24	0.39	9.86	0.35	NS	NS		
	S & B Avgs.							0.15	0	3.00	0	NS	NS	0.83	0.13	6.22	0.92	NS	NS		
	Cell Avg.							0.07 ± 0.18		1.50 ± 2.45		-	-	0.48 ± 0.61		3.57 ± 4.56		-	-		
5	14							0.37	0	0	0.42	NS	NS	2.52	0	10.33	1.30	NS	NS		
	15							0.44	0	14.20	0.89	NS	NS	0	0	14.15	2.96	NS	NS		
	16							0.44	0	11.60	0	NS	NS	2.29	0.36	55.17	0.39	NS	NS		
	20							0		1.46		2.44		0.49		0.49		0			
	S & B Avgs.							0.42	0	8.60	0.44	NS	NS	1.58	0.12	26.55	1.55	NS	NS		
	Cell Avg.							0.18 ± 0.22		4.08 ± 6.09		2.44 ± 0		0.80 ± 1.10		12.11 ± 19.72		0 ± 0			
6	17							0	0	31.24	0.87	NS	NS	0	0	3.58	2.81	NS	NS		
	Cell Avg.							0 ± 0		16.06 ± 21.47		-	-	0 ± 0		3.20 ± 0.54		-	-		
Run Avgs.	S & B Avgs.							0.26	0.10	4.70	0.40	NS	NS	5.34	1.01	9.26	0.90	NS	NS		
	Overall							0.23 ± 0.51		2.46 ± 5.75		4.72 ± 5.33		2.97 ± 7.20		4.76 ± 10.05		5.52 ± 6.54			

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-7. Densities (Numbers/100 m³) of Freshwater Drum at Each Station by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20).

Transect	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
1	1	0	0.20	0	0	0	0	0	0	0	0	0	0				
	2	0	0	0	0.32	0	0	0	0	0	0	0	NS				
	3	0	0	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	0	0.07	0	0.11	0	0	0	0	0	0	0	0				
	Cell Avg.	0.03 ± 0.08		0.05 ± 0.13		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
2	4	0	0	0	0.35	0	0	0	0	0	0	0	0				
	5	0	0	0	0	0	0.61	0	0	0	0	0	0				
	6	0	0	0	0	0	0	0	0	0	0	0	0				
	18	0		10.17		0		0		0		0					
	S & B Avg.	0	0	0	0.12	0	0.20	0	0	0	0	0	0				
	Cell Avg.	0 ± 0		1.50 ± 3.32		0.09 ± 0.23		0 ± 0		0 ± 0		0 ± 0					
3	7	0	0	0	0	0	0	0	0	0	0	0	0				
	8	0.38	0.61	0	0.35	0	0.36	0	0	0	0	0	0				
	9	0	0	0	0	0	0	0	0	0	0	0	0				
	10	NS	NS	0	0	0	0	0	0	0	0	0	0				
	19	0		0		0		0		0		0					
	S & B Avg.	0.13	0.20	0	0.09	0	0.09	0	0	0	0	0	0				
	Cell Avg.	0.14 ± 0.25		0.04 ± 0.12		0.04 ± 0.12		0 ± 0		0 ± 0		0 ± 0					
4	11	NS	NS	3.03	2.15	0	0	0	0	0	0	0	0				
	12	NS	NS	0.37	1.32	0.35	2.46	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0.34	0	0	0	0	0	0				
	S & B Avg.	NS	NS	1.13	1.16	0.12	0.93	0	0	0	0	0	0				
	Cell Avg.	-	-	1.14 ± 1.25		0.52 ± 0.96		0 ± 0		0 ± 0		0 ± 0					
5	14	NS	NS	0	182.21	0	2.08	0	0	0	0	0	0.38				
	15	NS	NS	4.58	0.70	0.73	0.98	0	0	0	0	0	0				
	16	NS	NS	0	0	0	0	0	0	0	0	0	0				
	20	15.61		0		1.95		0		0		0					
	S & B Avg.	NS	NS	1.53	60.97	0.24	1.22	0	0	0	0	0	0.13				
	Cell Avg.	15.61 ± 0		26.78 ± 68.56		0.91 ± 1.06		0 ± 0		0 ± 0		0.06 ± 0.15					
6	17	NS	NS	504.64	143.16	0.67	0	0	0	0	0	0	0				
	Cell Avg.	-	-	323.90 ± 255.61		0.33 ± 0.47		0 ± 0		0 ± 0		0 ± 0					
Run Avgs.	S & B Avg.	0.01	0.09	30.15	19.44	0.10	0.44	0	0	0	0	0	0.02				
	Overall	0.80 ± 3.40		23.06 ± 89.57		0.30 ± 0.67		0 ± 0		0 ± 0		0.01 ± 0.06					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-8. Densities (Numbers/100 m³) Of Freshwater Drum at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1									0	0	NS	NS	0	0	0	3.38				
	2									0	0	NS	NS	0	0	0	0				
	3									0	0	NS	NS	0	0	0	0.29				
	S & B Avgs.									0	0	NS	NS	0	0	0	1.22				
	Cell Avg.									0 ± 0		-	-	0 ± 0		0.61 ± 1.36					
2	4									0	0	NS	NS	0	0	0	0				
	5									0	0.39	NS	NS	0	0	0	0				
	6									0	0	NS	NS	0	0	0	0				
	18									0		0		0		0					
	S & B Avgs.									0	0.13	NS	NS	0	0	0	0				
	Cell Avg.									0.06 ± 0.15		0 ± 0		0 ± 0		0 ± 0					
3	7									0	0	NS	NS	0	0	0	0				
	8									0	0	NS	NS	0	0.52	0	0				
	9									0	0	NS	NS	0	1.72	0	1.26				
	10									0	0	NS	NS	0	1.31	0.49	0				
	19									0		0		0		0					
	S & B Avgs.									0	0	NS	NS	0	0.89	0.12	0.32				
	Cell Avg.									0 ± 0		0 ± 0		0.39 ± 0.66		0.20 ± 0.43					
4	11									0	5.97	NS	NS	0	0	0	0				
	12									0	0	NS	NS	0	0.54	0	0				
	13									0	0	NS	NS	0	0.39	0	0				
	S & B Avgs.									0	1.99	NS	NS	0	0.31	0	0				
	Cell Avg.									1.00 ± 2.44		-	-	0.15 ± 0.24		0 ± 0					
5	14									3.90	27.23	NS	NS	0	0	0	0				
	15									1.70	6.24	NS	NS	0	0	0	0				
	16									1.86	5.55	NS	NS	0	0.36	0	0				
	20									0		0		0		0					
	S & B Avgs.									2.49	13.01	NS	NS	0	0.12	0	0				
	Cell Avg.									6.64 ± 9.35		0 ± 0		0.05 ± 0.14		0 ± 0					
6	17									11.66	11.80	NS	NS	0	0.39	0	0				
	Cell Avg.									11.73 ± 0.10		-	-	0.20 ± 0.28		0 ± 0					
Run Avgs.	S & B Avgs.									1.12	3.36	NS	NS	0	0.31	0.03	0.29				
	Overall									2.06 ± 5.23		0 ± 0		0.14 ± 0.37		0.15 ± 0.59					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-9. Densities (Numbers/100 m^3) of Carp at Each Station by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20).

Transect	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
1	1	1.05	0	0	2.07	29.64	0	1.00	1.00	0	0	0.72	0.98				
	2	4.17	0	0	0	0	0	0	0	0	0	0	0				
	3	0	0	0	0	0	0	0	0	0	0	0	NS				
	S & B Avg.	1.74	0	0	0.69	9.88	0	0.33	0.33	0	0	0.24	0.49				
	Cell Avg.	0.87 ± 1.67		0.34 ± 0.84		4.94 ± 12.10		0.33 ± 0.52		0 ± 0		0.34 ± 0.47					
2	4	4.50	4.23	0	0.35	0	0	0	0	0	0.34	0	0				
	5	0	0	0.65	0.69	0	0	0	0	0	0	0	0				
	6	0	0	0	0	0	0	0.35	0	0	0	0	0				
	18	1.27		10.17		1.91		0.64		0		0					
	S & B Avg.	1.50	1.41	0.22	0.35	0	0	0.12	0	0	0.11	0	0				
	Cell Avg.	1.43 ± 2.06		1.69 ± 3.75		0.27 ± 0.72		0.14 ± 0.25		0.05 ± 0.13		0 ± 0					
3	7	0	0	0	0	0	0	0.38	0	0	0	0	0				
	8	0	0.31	0	0	0.33	0	0	0	0	0	0	0				
	9	0	0	0	0	0.36	0	0	0	0	0	0	0				
	10	NS	NS	0	0	0	0	0	0	0	0	0	0				
	19	0		0		0		0		0		0					
	S & B Avg.	0	0.10	0	0	0.17	0	0.09	0	0	0	0	0				
	Cell Avg.	0.04 ± 0.12		0 ± 0		0.08 ± 0.15		0.04 ± 0.12		0 ± 0		0 ± 0					
4	11	NS	NS	0.38	0	0	0	0	0	0	0	0	0				
	12	NS	NS	0	0	0	0	0	0	0	0	0	0				
	13	NS	NS	0	0	0	0	0	0	0	0	0	0				
	S & B Avg.	NS	NS	0.13	0	0	0	0	0	0	0	0	0				
	Cell Avg.	-	-	0.06 ± 0.16		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
5	14	NS	NS	0	0	0.72	0	0	0	0.38	0	0	0				
	15	NS	NS	0	0	0	0	0	0	0	0	0	0				
	16	NS	NS	0	0	0	0	0.68	0	0	0	0	0				
	20	1.46		0		0		0		0		0					
	S & B Avg.	NS	NS	0	0	0.24	0	0.23	0	0.13	0	0	0				
	Cell Avg.	1.46 ± 0		0 ± 0		0.10 ± 0.27		0.10 ± 0.26		0.06 ± 0.14		0 ± 0					
6	17	NS	NS	0	0	0	0	0	0	0	0	0	0				
	Cell Avg.	-	-	0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
Run Avgs.	S & B Avg.	1.08	0.50	0.06	0.18	1.83	0	0.14	0.06	0.02	0.02	0.04	0.06				
	Overall	0.81 ± 1.53		0.39 ± 1.69		0.89 ± 4.87		0.11 ± 0.27		0.02 ± 0.08		0.05 ± 0.20					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-10. Densities (Numbers/100 m^3) of Carp at Each Station, by Transect, 1976. (S & B Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1							0	0	0	0	NS	NS	1.75	1.80	0	2.42	NS	NS		
	2							0	0	0	0	NS	NS	0	0.37	0	0.31	NS	NS		
	3							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0	0	NS	NS	0.58	0.72	0	0.91	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		-	-	0.65 ± 0.88		0.45 ± 0.97		-	-		
2	4							0.88	0	0	0	NS	NS	17.13	1.96	0	0	NS	NS		
	5							NS	NS	0	0	NS	NS	0	0.70	0.41	0	NS	NS		
	6							0	0	0	0	NS	NS	0	0.81	0	13.91	NS	NS		
	18							0.64		0		0		0		0		0.64			
	S & B Avgs.							0.44	0	0	0	NS	NS	5.71	1.16	0.14	4.64	NS	NS		
	Cell Avg.							0.30 ± 0.42		0 ± 0		0 ± 0		2.94 ± 6.30		2.05 ± 5.23		0.64 ± 0			
3	7							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	8							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	9							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	10							0		0.46		0		0		0		0			
	19							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0 ± 0		0.05 ± 0.15		0 ± 0		0 ± 0		0 ± 0		0 ± 0			
	Cell Avg.																				
4	11							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	12							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	13							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0 ± 0		0 ± 0		-	-	0 ± 0		0 ± 0		-	-		
	Cell Avg.																				
5	14							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	15							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	16							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	20							0		0		0.98		0		0		0			
	S & B Avgs.							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		0.98 ± 0		0 ± 0		0 ± 0		0 ± 0			
6	17							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	Cell Avg.							0 ± 0		0 ± 0		-	-	0 ± 0		0 ± 0		-	-		
Run Avgs.	S & B Avgs.							0.06	0	0	0	NS	NS	1.11	0.33	0.02	0.98	NS	NS		
	Overall							0.04 ± 0.18		0.01 ± 0.08		0.33 ± 0.57		0.66 ± 2.83		0.46 ± 2.31		0.21 ± 0.37			

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-11. Densities (Numbers/100 m³) of Rainbow Smelt at Each Station by Transect, 1975. (S & B* Averages Exclude Beach Stations 18-20)

Transect	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
1	1	0.63	0	14.26	24.79	0	0	0	0	0	0	0	0	NS	NS	0	0
	2	0	0	0	0.32	0	0	0	0	0	0	0	0	NS	NS	0	0
	3	0.38	0	0.35	0.34	0	0	0	0	0	0	0	NS	NS	NS	0	0
	S & B Avg.	0.34	0	4.87	8.48	0	0	0	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	0.17 ± 0.27		6.68 ± 10.50		0 ± 0		0 ± 0		0 ± 0		0 ± 0		-		0 ± 0	
2	4	26.21	41.23	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	5	6.96	9.61	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	6	0	3.82	0	0	0	0	0.35	0	0	0	0	0	NS	NS	0	0
	18	0		5.08		0		0.64		0		0	0	0		NS	
	S & B Avg.	11.06	18.22	0	0	0	0	0.12	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	12.55 ± 15.49		0.73 ± 1.92		0 ± 0		0.14 ± 0.25		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
3	7	16.49	29.15	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	8	15.37	33.48	0	0.69	0	0	0	0	0	0	0	0	NS	NS	0	0
	9	6.40	35.74	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	10	NS	NS	0.36	2.07	0	0	0	0	0	0	0	0	0	NS		
	19	0		3.64		0		0		0		0		NS	NS	0	0
	S & B Avg.	12.75	32.79	0.09	0.69	0	0	0	0	0	0	0	0	NS	NS	0	0
	Cell Avg.	19.52 ± 13.72		0.88 ± 1.28		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
4	11	NS	NS	4.54	13.24	0	0	0	0	0	0	0	0	NS	NS	0	0
	12	NS	NS	0.74	3.29	0	0	0	0	0	0	0	0	NS	NS	0	0
	13	NS	NS	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	S & B Avg.	NS	NS	1.76	5.51	0	0	0	0	0	0	0	0	-	-	0 ± 0	
	Cell Avg.	-	-	3.64 ± 5.06		0 ± 0		0 ± 0		0 ± 0		0 ± 0					
5	14	NS	NS	1.99	0.78	0	0	0	0	0	0	0	0	NS	NS	0	0
	15	NS	NS	22.55	30.77	0.73	0.33	0	0	0	0	0	0	NS	NS	0	0
	16	NS	NS	0.36	0.36	0	0	0	0	0	0	0	0	0		0	
	20	0		0		0		0		0		0		NS	NS	0	0
	S & B Avg.	NS	NS	8.30	10.64	0.24	0.11	0	0	0	0	0	0	0		0 ± 0	
	Cell Avg.	0 ± 0		8.12 ± 12.90		0.15 ± 0.28		0 ± 0		0 ± 0		0 ± 0					
6	17	NS	NS	0.66	0	0	0	0	0	0	0	0	0	NS	NS	1.16	0
	Cell Avg.	-	-	0.33 ± 0.47		0 ± 0		0 ± 0		0 ± 0		0 ± 0		-	-	0.58 ± 0.82	
Run Avgs.	S & B Avg.	8.95	17.00	2.70	4.51	0.04	0.02	0.02	0	0	0	0	0	NS	NS	0.07	0
	Overall	10.74 ± 14.00		3.55 ± 7.57		0.03 ± 0.13		0.03 ± 0.12		0 ± 0		0 ± 0		0 ± 0		0.03 ± 0.20	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-12. Densities (Numbers/100 m^3) of Rainbow Smelt at Each Station, by Transect, 1976. (S & B Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1	NS	NS	0.44	0.78	0	0	0.91	0.36	0.74	3.19	NS	NS	0.58	0	0	1.45				
	2	NS	NS	2.64	0.39	7.75	1.54	0.94	3.74	0	6.66	NS	NS	0	0	0	0				
	3	NS	NS	0	10.97	14.99	31.15	2.64	5.49	0.71	6.47	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	1.02	4.05	7.58	10.90	1.50	3.20	0.48	5.44	NS	NS	0.19	0	0	0.48				
	Cell Avg.	-	-	2.54 ± 4.24		9.24 ± 12.21		2.34 ± 2.00		2.96 ± 2.99		-	-	0.10 ± 0.24		0.24 ± 0.59					
2	4	NS	NS	0.44	0	0	0	1.32	0	1.10	0	NS	NS	0	0	0	0				
	5	NS	NS	0	1.18	NS	NS	NS	NS	0	8.23	NS	NS	0	0	0	0				
	6	NS	NS	NS	1.18	NS	NS	1.32	3.14	0	15.15	NS	NS	0	0	0	0				
	18	0		0.64		0		0		0		0		0		0					
	S & B Avgs.	NS	NS	0.15	0.78	0	0	1.32	1.57	0.36	7.79	NS	NS	0	0	0	0				
	Cell Avg.	0 ± 0		0.57 ± 0.53		0 ± 0		1.15 ± 1.29		3.50 ± 5.96		0 ± 0		0 ± 0		0 ± 0					
3	7	NS	NS	0	0.39	NS	NS	0.38	1.07	0	1.48	NS	NS	0	0	0	0				
	8	NS	NS	1.76	0.78	NS	NS	0	3.14	0	6.57	NS	NS	0	0	0	0				
	9	NS	NS	0	2.35	NS	NS	0.44	9.80	0	3.43	NS	NS	0	0	0	0				
	10	NS	NS	0	2.76	NS	NS	0	0.39	0	11.82	NS	NS	0	0	0	0				
	19	0		0		0		0		0		0		0		0					
	S & B Avgs.	NS	NS	0.44	1.57	NS	NS	0.20	3.60	0	5.82	NS	NS	0	0	0	0				
	Cell Avg.	0 ± 0		0.89 ± 1.11		0 ± 0		1.69 ± 3.20		2.59 ± 4.13		0 ± 0		0 ± 0		0 ± 0					
4	11	NS	NS	0.76	0	NS	NS	0	0	0	0	NS	NS	0	0	0	0				
	12	NS	NS	0	0.83	NS	NS	0	11.76	0	2.15	NS	NS	0	0	0	0				
	13	NS	NS	0	0	NS	NS	0	26.65	1.44	7.55	NS	NS	0	0	0	0				
	S & B Avgs.	NS	NS	0.26	0.28	NS	NS	0	12.80	0.48	3.23	NS	NS	0	0	0	0				
	Cell Avg.	-	-	0.26 ± 0.41		-	-	6.40 ± 10.98		1.86 ± 2.93		-	-	0 ± 0		0 ± 0					
5	14	NS	NS	1.32	0.40	NS	NS	0.75	5.99	0	0	NS	NS	0	0	0	0				
	15	NS	NS	0	0	NS	NS	1.76	36.50	0	0.45	NS	NS	0	0	0	0				
	16	NS	NS	0	0	NS	NS	0.87	0.78	0.46	0.69	NS	NS	0	0	0	0				
	20	0		0		NS		0		0		0		0		0					
	S & B Avgs.	NS	NS	0.44	0.13	NS	NS	1.12	14.42	0.16	0.38	NS	NS	0	0	0	0				
	Cell Avg.	0 ± 0		0.24 ± 0.50		-	-	6.66 ± 13.31		0.23 ± 0.30		0 ± 0		0 ± 0		0 ± 0					
6	17	NS	NS	1.36	0	NS	NS	1.76	1.18	0.47	0.44	NS	NS	0	0	0	0				
	Cell Avg.	-	-	0.68 ± 0.96		-	-	1.47 ± 0.41		0.45 ± 0.02		-	-	0 ± 0		0 ± 0					
Run Avgs.	S & B Avgs.	NS	NS	0.54	1.29	5.68	8.15	0.82	6.87	0.29	4.37	NS	NS	0.03	0	0	0.08				
	Overall	0 ± 0		0.87 ± 1.90		5.54 ± 10.28		3.52 ± 7.61		2.14 ± 3.68		0 ± 0		0.02 ± 0.10		0.04 ± 0.24					

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-13. Densities (Numbers/100 m³) of White Bass at Each Station by Transect, 1975. (S & B Averages Exclude Beach Stations 18-20).

Transect	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B
1	1	0	0	1.07	2.07	0	0	0	0	0	0	0	0	NS	NS	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	3	0	1.86	0	0	0	0	0	0	0	0	0	NS	NS	NS	0	0
	S & B Avg.	0	0.62	0.36	0.69	0	0	0	0	0	0	0	0	-	-	0	0
	Cell Avg.	0.31 ± 0.76		0.52 ± 0.87		0 ± 0		0 ± 0		0 ± 0		0 ± 0		-		0 ± 0	
2	4	0.41	0	0	0.35	0	0	0	0	0	0	0	0	NS	NS	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0	0
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	0
	18	2.54		30.50		0		0		0		0		NS	NS	0	0
	S & B Avg.	0.14	0	0	0.12	0	0	0	0	0	0	0	0	0		0	0
	Cell Avg.	0.42 ± 0.95		4.41 ± 11.51		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
3	7	0.42	2.52	0	0	0	0	0	0.32	0	0	0	0	NS	NS	0	0
	8	0.38	3.38	0	0	0	0.36	0	0	0	0	0	0	NS	NS	0	0
	9	1.20	1.72	0	0.32	0	0	0	0	0	0	0	0	NS	NS	0	0
	10	NS	NS	0	0.34	1.76	5.33	0	0	0	0	0	0	0	NS	NS	0
	19	0.46		34.61		0		0.46		0		0		0		0	0
	S & B Avg.	0.67	2.54	0	0.17	0.44	1.42	0	0.08	0	0	0	0	NS	NS	0	0
	Cell Avg.	1.44 ± 1.17		3.92 ± 11.51		0.83 ± 1.78		0.09 ± 0.18		0 ± 0		0 ± 0		0 ± 0		0 ± 0	
4	11	NS	NS	7.96	30.06	0.64	1.97	0	0	0	0	0	0	NS	NS	0	0
	12	NS	NS	2.59	60.28	0	0.92	0	0	0	0	0	0	NS	NS	0	0
	13	NS	NS	0.33	12.32	0	1.01	0	1.79	0	0	0	0	NS	NS	0	0
	S & B Avg.	NS	NS	3.62	34.12	0.21	1.30	0	0.60	0	0	0	0	-	-	0	0
	Cell Avg.	-	-	18.87 ± 22.87		0.76 ± 0.74		0.30 ± 0.73		0 ± 0		0 ± 0		-		0 ± 0	
5	14	NS	NS	216.32	262.93	15.75	9.39	0	0	0.38	2.70	0	0	NS	NS	0.38	0
	15	NS	NS	85.62	10.49	1.09	0	0	0	0	0	0	0	NS	NS	0	0.32
	16	NS	NS	0.36	0.72	0.70	0.33	0	0	0	0	0	0	NS	NS	0	0
	20	64.89		23.42		0.98		0.49		0		0		0		0	
	S & B Avg.	NS	NS	100.77	91.38	5.85	3.24	0	0	0.13	0.90	0	0	NS	NS	0.13	0.11
	Cell Avg.	64.89 ± 0		85.70 ± 109.94		4.33 ± 6.12		0.07 ± 0.18		0.51 ± 1.08		0 ± 0		0 ± 0		0.10 ± 0.17	
6	17	NS	NS	77.64	269.15	2.00	1.26	0.33	0	0	0	0	0	NS	NS	0.77	0
	Cell Avg.	-	-	173.39 ± 135.42		1.63 ± 0.52		0.17 ± 0.24		0 ± 0		0 ± 0		-		0.38 ± 0.54	
Run Avgs.	S & B Avg.	0.27	1.05	23.05	38.16	1.29	1.21	0.08	0.12	0.02	0.16	0	0	NS	NS	0.07	0.12
	Overall	3.80 ± 14.04		30.52 ± 69.68		1.18 ± 3.03		0.09 ± 0.31		0.08 ± 0.45		0 ± 0		0 ± 0		0.04 ± 0.15	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-14. Densities (Numbers/100 m³) of White Bass at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
	1							0	0	0	0	NS	NS	0	0	1.03	0	NS	NS		
1	2							0	0	0.88	2.74	NS	NS	0	0	0	0	NS	NS		
	3							0	0	0	0	NS	NS	0	0	0	0	NS	NS		
	S & B Avgs.							0	0	0.24	0.91	NS	NS	0	0	0.34	0	NS	NS		
	Cell Avg.							0 ± 0		0.60 ± 1.10		-	-	0 ± 0		0.17 ± 0.42		-	-		
	4							0	0	0	0	NS	NS	0	0.39	0	0	NS	NS		
	5							NS	NS	2.37	5.88	NS	NS	0	0	0	0	NS	NS		
2	6							0	0	0	1.94	NS	NS	0	0	0	0	NS	NS		
	18							0		0		1.27		3.81		0		0			
	S & B Avgs.							0	0	0.79	2.61	NS	NS	0	0.13	0	0	NS	NS		
	Cell Avg.							0 ± 0		1.46 ± 2.20		1.27 ± 0		0.60 ± 1.42		0 ± 0		0 ± 0			
	7							0	0	0.50	0	NS	NS	0	2.20	0	0	NS	NS		
	8							0	0	0	0.50	NS	NS	0	2.58	0	0.34	NS	NS		
3	9							0.44	0	0.48	1.72	NS	NS	0	0	0	0	NS	NS		
	10							0	0	0.40	25.00	NS	NS	0.88	1.31	0	0	NS	NS		
	19							0		0		0		0		0		0.46			
	S & B Avgs.							0.11	0	0.35	6.80	NS	NS	0.22	1.52	0	0.09	NS	NS		
	Cell Avg.							0.05 ± 0.15		3.18 ± 8.20		0 ± 0		0.77 ± 1.04		0.04 ± 0.11		0.46 ± 0			
	11							0	0	2.02	7.80	NS	NS	0	0	0	0	NS	NS		
4	12							0	0	0	1.07	NS	NS	1.24	0	0	0.36	NS	NS		
	13							0	0	1.44	2.52	NS	NS	0.62	0.78	0	0	NS	NS		
	S & B Avgs.							0	0	1.15	3.80	NS	NS	0.62	0.26	0	0.12	NS	NS		
	Cell Avg.							0 ± 0		2.48 ± 2.75		-	-	0.44 ± 0.52		0.06 ± 0.15		-	-		
	14							0	0.75	22.12	8.38	NS	NS	13.26	2.35	0	0	NS	NS		
	15							0	0	1.14	0	NS	NS	0	0	0	0	NS	NS		
5	16							0	0	0.46	0.35	NS	NS	2.22	5.09	0	0	NS	NS		
	20							0		0.93		2.93		0.49		0		0			
	S & B Avgs.							0	0.25	7.91	2.91	NS	NS	5.16	2.48	0	0	NS	NS		
	Cell Avg.							0.11 ± 0.28		4.78 ± 8.19		2.93 ± 0		3.34 ± 4.73		0 ± 0		0 ± 0			
6	17							2.64	12.39	0.93	0	NS	NS	0	0	0.36	0	NS	NS		
	Cell Avg.							7.51 ± 6.90		0.47 ± 0.66		-	-	0 ± 0		0.18 ± 0.25		-	-		
Run Avgs.	S & B Avgs.							0.19	0.82	1.87	3.41	NS	NS	1.07	0.86	0.08	0.04	NS	NS		
	Overall							0.46 ± 2.13		2.47 ± 5.51		1.40 ± 1.47		1.01 ± 2.39		0.06 ± 0.19		0.15 ± 0.27			

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-15. Densities (Numbers/100 m^3) of All Species at Each Station, by Transect, 1975. (*S & B Averages Exclude Beach Stations 18-20).

		Run: 1		2		3		4		5		6		7		8	
Transect	Stations	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B
1	1	82.32	72.73	902.67	1204.54	30.63	1.06	93.57	90.58	1.76	1.83	1.44	2.28	NS	NS	5.75	13.22
	2	4.17	0.38	133.48	221.23	38.35	24.22	10.94	12.73	2.86	4.27	2.18	1.30	NS	NS	1.25	0
	3	9.85	4.17	38.11	136.02	2.28	5.26	111.67	4.39	9.70	0.64	0.67	NS	NS	NS	0	0
	S & B Avg.	32.11	25.76	358.09	520.60	23.75	10.38	72.06	35.90	4.78	2.25	1.43	1.64	NS	NS	2.33	4.41
	Cell Avg.	28.94 ± 37.88		439.34 ± 488.74		17.07 ± 16.92		53.98 ± 49.49		3.51 ± 3.27		1.51 ± 0.71		-	-	3.37 ± 5.32	
2	4	145.37	110.46	21.33	34.57	6.40	27.42	113.91	15.15	1.49	1.35	0.78	0.65	NS	NS	12.09	7.20
	5	9.83	11.46	1.31	4.86	118.45	71.75	96.36	12.04	3.15	0.98	1.97	0	NS	NS	0	0
	6	0.78	14.44	43.95	57.43	49.90	40.34	20.98	7.65	5.01	3.15	18.70	1.14	NS	NS	0	0
	18	55.45		2704.28		104.84		39.41		12.07		20.33		0		NS	
	S & B Avg.	51.99	45.46	22.20	32.28	58.25	46.50	77.98	11.61	3.20	1.83	7.15	0.60	NS	NS	4.33	2.40
	Cell Avg.	51.11 ± 57.40		409.68 ± 1012.03		59.87 ± 40.80		43.64 ± 43.50		3.88 ± 3.88		6.22 ± 9.11		0 ± 0		3.36 ± 5.52	
3	7	83.72	55.78	0.33	5.09	49.26	61.50	6.39	1.62	1.94	1.03	0	1.74	NS	NS	0.39	0.34
	8	141.40	62.65	2.49	4.51	68.52	30.06	1.13	1.33	0	0	0.78	0	NS	NS	1.16	0
	9	207.48	108.06	11.86	0.97	122.75	42.56	17.43	2.66	24.94	0	0	0	NS	NS	0	0
	10	NS	NS	34.05	11.71	47.92	59.30	94.64	5.51	0.76	0	19.70	1.20	NS	NS	0	0
	19	7.74		721.31		116.58		14.12		36.88		8.20		0		NS	
	S & B Avg.	144.20	75.50	12.18	5.57	72.11	48.36	29.90	2.78	6.91	0.26	5.12	0.73	NS	NS	0.39	0.09
	Cell Avg.	95.26 ± 64.94		88.04 ± 237.70		66.50 ± 32.20		16.09 ± 30.03		7.28 ± 13.74		3.51 ± 6.61		0 ± 0		0.24 ± 0.41	
4	11	NS	NS	39.02	56.19	188.18	148.01	4.62	2.16	4.88	8.42	0.39	0	NS	NS	0.40	0
	12	NS	NS	28.46	363.64	44.04	64.50	25.13	5.58	1.62	0	1.16	0	NS	NS	0	0
	13	NS	NS	15.71	139.74	26.79	121.55	7.69	5.37	12.45	0	0.41	0	NS	NS	0.41	0
	S & B Avg.	NS	NS	27.72	186.52	86.34	111.35	12.48	4.37	6.32	2.81	0.65	0	NS	NS	0.27	0
	Cell Avg.	-	-	107.12 ± 133.15		98.95 ± 63.70		8.42 ± 8.38		4.56 ± 5.05		0.32 ± 0.44		-	-	0.13 ± 0.21	
5	14	NS	NS	1500.00	1430.64	1356.48	1564.58	10.10	7.55	15.28	6.55	21.26	6.55	NS	NS	1.93	0
	15	NS	NS	711.06	119.23	153.46	91.89	8.69	5.65	0.74	0	0.41	0	NS	NS	5.39	0.63
	16	NS	NS	4.26	4.69	2.82	5.21	7.52	0.85	0.77	0	1.15	0	NS	NS	0	0
	20	478.63		1170.96		445.94		2.44		21.47		8.29		0		0	
	S & B Avg.	NS	NS	738.44	518.19	504.25	553.89	8.77	4.68	5.60	2.18	7.61	2.18	NS	NS	2.44	0.21
	Cell Avg.	478.63 ± 0		705.84 ± 670.86		517.20 ± 664.13		6.11 ± 3.37		8.96 ± 9.18		5.38 ± 7.77		0 ± 0		1.14 ± 2.01	
6	17	NS	NS	2501.00	549.75	1175.49	1175.21	48.11	23.57	2.57	0.69	1.06	0	NS	NS	3.47	0
	Cell Avg.	-	-	1525.37 ± 1379.74		1175.35 ± 0.20		35.84 ± 17.35		1.63 ± 1.33		0.53 ± 0.75		-	-	1.73 ± 2.45	
Run Avgs.	S & B Avg.	76.10	48.90	352.30	255.58	204.81	207.94	39.03	12.02	5.29	1.70	4.24	0.91	NS	NS	1.95	1.26
	Overall	79.85 ± 108.23		403.53 ± 688.64		207.68 ± 403.15		25.38 ± 35.00		5.11 ± 8.06		3.43 ± 6.30		0 ± 0		1.56 ± 3.40	

* S = Surface; B = Bottom; NS = No Sample

Appendix C

Table C-16. Densities (Numbers/100 m^3) Of All Species at Each Station, by Transect, 1976. (S & B* Averages Exclude Beach Stations 18-20)

Transects	Stations	Run: 1 S	1 B	2 S	2 B	3 S	3 B	4 S	4 B	5 S	5 B	6 S	6 B	7 S	7 B	8 S	8 B	9 S	9 B	10 S	10 B
1	1	NS	NS	0.44	1.96	1.84	0	1.52	2.48	3.34	9.57	NS	NS	36.71	12.27	11.36	14.51	NS	NS	NS	NS
	2	NS	NS	2.64	0.39	11.36	13.35	7.54	12.84	38.65	11.36	NS	NS	65.22	77.46	21.82	69.57	NS	NS	NS	NS
	3	NS	NS	0	10.97	26.11	42.69	3.51	5.49	31.72	64.01	NS	NS	75.94	44.54	509.23	57.62	NS	NS	NS	NS
	S & B Avgs.	NS	NS	1.02	4.44	13.10	18.68	4.19	6.94	24.57	28.32	NS	NS	59.29	44.76	180.80	47.23	NS	NS	NS	NS
	Cell Avg.	-	-	2.73 ± 4.16		15.89 ± 16.12		5.56 ± 4.17		26.44 ± 22.95		-	-	52.02 ± 25.55		114.02 ± 195.08		-	-	-	-
2	4	NS	NS	1.32	1.18	0	0	8.34	4.31	903.61	687.50	NS	NS	24.16	11.36	2.34	0	NS	NS	7.58	1.23
	5	NS	NS	0	1.18	NS	NS	NS	NS	102.46	62.70	NS	NS	25.28	5.59	2.48	0.38	NS	NS	0.85	NS
	6	NS	NS	NS	1.57	NS	NS	13.62	15.67	5.25	20.59	NS	NS	188.81	160.72	14.78	16.62	NS	NS	NS	NS
	18	1.27		1.27		0.64		50.22		0		14582.96		127.78		1.27		22.25		3.81	
	S & B Avgs.	NS	NS	0.66	1.31	0	0	10.98	9.99	337.11	256.93	NS	NS	79.42	59.22	6.53	5.67	NS	NS	4.21	1.23
	Cell Avg.	1.27 ± 0		1.08 ± 0.55		0.21 ± 0.37		18.43 ± 18.32		254.59 ± 376.46		14582.96 ± 0		77.67 ± 78.48		5.41 ± 7.11		22.25 ± 0		3.37 ± 3.10	
3	7	NS	NS	1.32	3.53	NS	NS	3.82	2.67	53.54	37.55	NS	NS	0	3.07	1.54	0.40	NS	NS	1.34	0.54
	8	NS	NS	3.07	1.18	NS	NS	0.63	3.92	78.92	22.73	NS	NS	1.55	8.78	3.47	0.34	NS	NS	3.72	0.43
	9	NS	NS	0.44	2.35	NS	NS	1.76	16.85	11.61	10.72	NS	NS	3.42	3.00	1.67	1.26	NS	NS	2.57	0.65
	10	NS	NS	0.41	2.76	NS	NS	0	0.39	14.56	40.91	NS	NS	1.32	3.93	9.78	0.73	NS	NS	0.57	0
	19	0		18.22		4.55		2.73		31.88		4.10		5.47		2.28		16.40		34.62	
	S & B Avgs.	NS	NS	1.31	2.45	NS	NS	1.55	5.96	39.66	27.95	NS	NS	1.57	4.70	4.11	0.68	NS	NS	2.05	0.41
	Cell Avg.	0 ± 0		3.70 ± 5.56		4.55 ± 0		3.64 ± 5.16		33.60 ± 22.39		4.10 ± 0		3.13 ± 2.62		2.38 ± 2.94		16.40 ± 0		4.94 ± 11.19	
4	11	NS	NS	3.82	9.43	NS	NS	7.90	6.27	73.74	126.62	NS	NS	2.27	0.39	9.66	2.42	NS	NS	1.16	0
	12	NS	NS	0.44	1.24	NS	NS	1.76	12.54	106.06	13.60	NS	NS	4.36	1.60	1.11	1.09	NS	NS	1.09	0
	13	NS	NS	0	0	NS	NS	1.32	27.43	22.01	19.05	NS	NS	11.21	3.53	81.05	12.69	NS	NS	0.33	0
	S & B Avgs.	NS	NS	1.42	3.56	NS	NS	3.66	15.41	67.27	53.09	NS	NS	5.95	1.84	30.61	5.40	NS	NS	0.86	0
	Cell Avg.	-	-	2.49 ± 3.69		-	-	9.54 ± 9.70		60.18 ± 49.03		-	-	3.89 ± 3.85		18.00 ± 31.26		-	-	0.43 ± 0.55	
5	14	NS	NS	3.29	10.28	NS	NS	19.86	34.79	402.06	269.80	NS	NS	32.20	6.66	10.33	1.55	NS	NS	0.37	0.43
	15	NS	NS	2.23	9.50	NS	NS	9.22	74.72	603.98	13.82	NS	NS	3.83	0	15.87	5.92	NS	NS	0	0
	16	NS	NS	1.44	0.31	NS	NS	2.63	1.18	574.22	21.17	NS	NS	61.53	54.55	57.11	2.08	NS	NS	0.37	0
	20	0		0.49		NS		1.95		24.87		8.78		2.93		0.49		0.49		5.85	
	S & B Avgs.	NS	NS	2.32	6.70	NS	NS	10.57	36.90	526.75	101.59	NS	NS	32.52	20.40	27.77	3.18	NS	NS	0.24	0.14
	Cell Avg.	0 ± 0		3.93 ± 4.20		-	-	11.72 ± 19.74		272.84 ± 261.12		8.78 ± 0		23.10 ± 26.24		13.34 ± 20.07		0.49 ± 0		1.00 ± 2.15	
6	17	NS	NS	2.73	9.59	NS	NS	82.56	106.04	1572.96	297.64	NS	NS	0.58	1.57	5.01	7.03	NS	NS	0	6.99
	Cell Avg.	-	-	6.16 ± 4.85		-	-	94.30 ± 16.60		935.30 ± 901.79		-	-	1.07 ± 0.71		6.02 ± 1.43		-	-	3.50 ± 4.94	
Run Avgs.	S & B Avgs.	NS	NS	1.47	3.96	9.83	14.01	10.37	20.48	270.51	101.72	NS	NS	31.67	23.47	44.62	11.42	NS	NS	1.53	0.86
	Overall	0.42 ± 0.73		3.08 ± 4.10		10.05 ± 14.24		15.67 ± 25.10		172.56 ± 322.75		4865.3 ± 8415.8		29.02 ± 45.87		25.86 ± 84.12		13.05 ± 11.26		2.66 ± 6.62	

* S = Surface; B = Bottom; NS = No Sample

Appendix D

Larval fish densities (number/100 m³) by station for those species not described by contour and transect. The number in the parenthesis indicates the station and the S and B indicates either the surface or bottom tow where larvae were captured.

Species	Year	Run	TRANSECT 1	2	3	4	5	6
Walleye	1975	2	0	0	0.46(19)	0	0	0
		3	0	0.31(6B)	0	0	0	0
	1976	5	0.37(1S)	0.39(5B),0.78(6B)	0.51(8B),0.43(9B)	0.36(13B)	0	0
Darters	1975	3	0	0	0.07(10S)	0.32(11S)	0	0
		4	0	0	0.38(7S)	0	0	0
		5	0	0	0	0.38(11S),0.35(11B)	0	0
		6	0	0.39(4S),0.66(4B)	0.39(8S)	0.39(11S),0.38(11S)	0.38(16S),0.36(17S)	0
	1976	4	0	0	0.46(19)	0	0	0
		8	0	0	0	0	0.39(16S)	0.07(17S)
Sunfish	1975	1	1.26(S)	0	0	0	0	0
		2	0	5.09(1B)	0.73(19)	0	0	5.73(17B)
		3	0	1.00(5S),0.30(5B)	0.67(8S),0.14(10S)	6.63(NS),1.97(11B)	9.31(14S),6.71(14B)	0
				3.18(1B)	0.75(19)			
		4	1.33(1S),1.33(1B)	1.80(4S),0.35(6S)	0.38(7S),0.66(8B)	0.36(11S),0.72(11B)	0	0
			1.03(2S),0.30(2B)	1.27(1B)	1.37(19)	0.37(12S)		
		5	0	0.36(4S),0.64(1B)	0	0.70(11B)	0	0
		6	0	0	0	0	0.49(20)	0
	1976	4	0.36(1B)	1.32(4S),0.78(4B)	0	0.44(11S)	0	0
		7	0.54(3S)	0	0	0	0	0
		8	1.03(3S)	0	0.40(7B),0.09(19)	0	0.76(14B)	0
Crappie	1975	2	0.34(3B)	0.38(6S)	0.15(10S),1.82(19)	0	0	0
	1976	4	0	0	0.78(9B)	0	0	0
		5	0	0	0	0	0.42(14B)	0
		6	NS	0(NS,4,5,6)	0(NS,7,8,9,10)	NS	0(NS,14,15,16)	NS
		7	0	0	0	0	0.36(16B)	0
Bass (Micropterus)	1975	4	0	1.27(1B)	0	0	0	0
		6	0	0	0	0	0.49(20)	0
Northern Pike	1975	3	0	0.64(1B)	0	0	0	0
		4	0.34(3B)	0	0	0	0	0
Muskellunge	1976	1	NS	1.27(1B),(NS,4,5,6)	0(NS,7,8,9,10)	NS	0(NS,13,15,16)	NS
		2	0	0	0.46(19)	0	0	0